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NOVEMBER 1985

Chilton's Food Engineering

In this issue: ENGINEERED FOODS

# THE CYCLAMATE BAN...WAS JUSTICE BLIND?

## SPECIAL REPORT

*Banned in 1970, edging toward a reclearance in 1986, will cyclamate get a new lease on life? Will it matter now?*

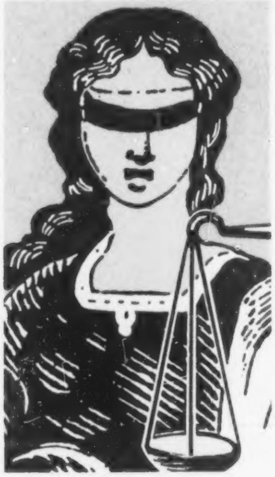
## CAPITAL SPENDING

*We track the most active companies in capital spending, detect investment trends.*

## MEGA – MERGER

*Philip Morris' $5.8 billion acquisition of General Foods creates a new #1 in the food industry.*

# Chilton's Food Engineering



**ABOUT THE COVER**

Were the scales of justice evenly balanced when cyclamate was banned in 1970? Some people think not and would like to see the sweetener approved for use in food and beverage products. Our cover story explores the industry's newest 'hot potato'.

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**FOOD ENGINEERING®** (ISSN 0193-323X) November 1985, Vol. 57, No. 11. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office

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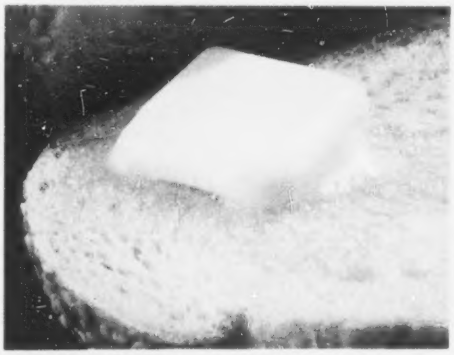

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Diet-Rite Cola ...the one with the wonderful taste!
SUGAR FREE
diet-rite cola
Real old-time cola taste ...and less than 1 calorie to its name.

**CYCLAMATE ANALYSIS:** Cyclamate coverage includes the bumpy road of regulatory milestones in the history of cyclamate. **PAGE 67**

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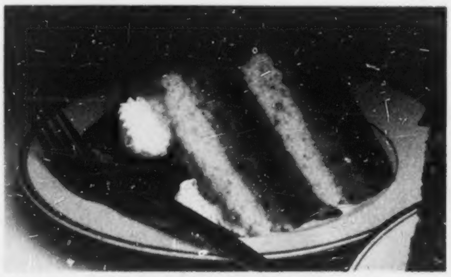

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CompAir Kellogg
CompAir K

*Special Emphasis*

**SANITATION & MAINTENANCE EQUIPMENT:**
This month's new product section is devoted to what's new in sanitation and maintenance equipment. **Pages 85 to 90**

LOOKING AHEAD . . .
*by Dr. A. Elizabeth Sloan*

# 'Boomers'

Baby boomers—that mega generation of 76.4 million—have affected every aspect of American society throughout three decades. Landon Y. Jones, author of *Great Expectations: America and the Baby Boom Generation*, has observed that in the 1950s the baby boomers gave us burgeoning suburbs and crowded elementary schools, in the 1960s they gave us rock 'n roll, fast foods, high crime, and unemployment, and in the 1970s they gave us swinging singles, working women, and rising housing prices.

Now the baby boomers are finally settling down to the business of having babies themselves, giving us an expanding children's market. And, as usual, the boomers are doing things in their own way, creating a new type of parent—one who expects more, knows more, and can spend more than the parent of previous generations.

## The echo boom

The new baby boomlet, which demographers are calling the "echo effect" of the first baby boom, produced 3.70 million babies in 1982. Although that birth rate falls short of the 4.3 million babies born during the peak baby boom year of 1957, it is up considerably from the low of 3 million births in 1975. And studies of birth and marriage statistics project that the number of births should continue to rise slightly, peak in 1988, and then level off.

This means that food products for infants and children should experience a boomlet of their own. Not only baby foods, but traditional children's products, such as cookies, peanut butter, potato chips, ice cream, candy, and cold cereal, should be able to do well in the growing children's market.

However, these products must be tailored to meet the needs and expectations of the "new parent" in order to succeed.

## The new parent

Baby boom mothers are having their children at a later age. The most dramatic increase in birth rate has occurred in the 30 to 34 year old group, in which first births tripled to 137,000 in 1982 from 42,000 in 1970. Between 1981 and 1982, first-birth rate increased by 18% for women aged 35 to 39. These older women have more education, are in a better financial position, and have more money to spend on their children than women who start their families earlier.

It is also significant that these births are first births. From 1981 through 1985, first births will account for 43% of *all* births, and Gerber estimates that parents and grandparents spend ten times more on first-born children than they do on subsequent children.

In addition, demographers expect that the new parent will have fewer children. With the fertility rate remaining fairly constant at 1.8, predictions are that families will remain small. Thus, the "echo boom" children will have a larger piece of the family income, a larger share of their parent's time, and a larger share of their parent's concern.

What these statistics imply is that the new parents will want high-quality, convenient food products for their children and they will be willing and able to pay a higher price for such products.

As Steven B. Most, vice president of marketing for Beech-Nut stated in an interview with *Adweek*, "There is a tremendously educated segment of the market out there who wants only the best for their baby."

Beech-Nut has introduced its new baby food product, *Stages*, as a premium brand which costs up to five cents more than the Gerber brand. Beech-Nut's promotion for its new line emphasizes that the product contains "no added sweeteners, modified starch fillers, MSG, artificial flavors, or artificial colorings."

## Problem ingredients

Our *Good Housekeeping* research shows that today's parents are not only concerned about problem ingredients in infant food, they are concerned about such ingredients in their older children's diets as well.

In December 1983, we conducted in-home, personal interviews in 20 cities with 200 mothers of children up to 12 years old. Three-fourths said that they are concerned about the nutrition in their children's main meals and snacks. From 75% to 95% said that they are very or somewhat concerned about the amount of salt, sugar, caffeine, and saturated fats their children eat, and from 57% to 73% said that they are limiting a "great deal" or "some" of their children's consumption of these ingredients.

Almost 80% said that they restrict their children's consumption of snack chips, saying that snack chips have "too much salt," they have "too many preservatives/junk," or "I prefer they eat nutritious food."

However, it is difficult to determine what these mothers mean by "limiting." When we asked how often their children eat certain snack items containing sugar or salt, 67.5% said that their children eat cookies every day or a few times a week,

### How mothers are limiting their children's intake of selected food ingredients

| | PERCENT OF WOMEN LIMITING INTAKE: | | | | |
|---|---|---|---|---|---|
| | GREAT DEAL | SOME | LITTLE | NONE AT ALL | DON'T USE |
| Sugar | 39.0% | 33.0% | 14.0% | 11.0% | 2.5% |
| Salt | 38.0 | 35.5 | 7.5 | 15.5 | 3.0 |
| Caffeine | 37.5 | 28.0 | 11.0 | 11.5 | 11.5 |
| Saccharin | 37.5 | 19.5 | 9.5 | 9.0 | 24.5 |
| Saturated Fats | 19.5 | 37.5 | 14.5 | 26.0 | 2.0 |
| Cholesterol | 16.5 | 37.5 | 15.5 | 28.0 | 2.0 |
| Nutrasweet | 16.5 | 15.5 | 14.5 | 30.0 | 23.5 |
| Calories | 8.5 | 28.5 | 16.0 | 46.0 | .5 |

and 50.5%, 40.5%, and 33.5% said that their children eat candy, ice cream, and potato chips, respectively, either every day or a few times a week.

## Healthy foods

It does appear, however, that mothers equate "fresh" and "natural" with "healthy" and that they therefore are making sure that fresh and natural foods are the main part of their children's diets. When we asked women in a separate study to name the foods that they associate with a healthy child, 60% mentioned vegetables, and 56% said fruit, followed by milk, meat, and whole-grained cereals. Mothers are basing their menu planning on this ideal of the healthy child; 94.5% of the mothers whom we interviewed reported that their children eat vegetables once a day or a few times a week; 88.5% said that their children eat fresh fruit every day or a few times a week; and 82.5% said that their children eat cheese that often.

Thirty percent said that they serve cookies as an after-school snack, but 23% said that they serve fruit and 14.5% said that they serve sandwiches after school. Milk and fruit juice were the favorite after-school beverages (45% and 34% response, respectively). In contrast, only 12.5% of the mothers said that they serve *Kool-Aid* after school, and only 7.5% said that they serve soda.

## Nutritional content

How do the women view the nutritional content of specific children's foods?

Sixty-seven percent think that all presweetened cereals have about the same nutritional value. More than half think that honey is more nutritious than sugar as a sweetener for cereals. Forty-seven percent agree that *Nutrasweet* would be a good replacement for sugar in presweetened cereal, 25.1% said it would not be a good replacement, and 27.4% were not sure.

Nutrition does not appear to be an important factor in the selection of cookies. When asked to name the single most important characteristic a cookie should have, almost three fourths of the women mentioned a characteristic related to taste or texture. Only 15% named "nutrition" or "a low amount of sugar" as important factors.

However, 43.5% of the women said that cookies could be improved, and many of that group suggested using fewer preservatives and additives and using less sugar.

The mothers also do not consider nutritional content when buying snack chips. Eighty-five percent said that they do not compare the nutritional content of different brands of snack chips. However, more than half said that they would give snack chips to their children *more often* if it were proven that snack chips have good nutritional value.

## Brand selection

Parents are also controlling their children's diets by limiting their influence in the types of brands they select. Although 42.0% of our respondents said that their children influence their choice of cold cereal "fairly often" or "almost always," the majority said that their children *never* influence the brand selection of other favorite children's foods, such as peanut butter, corn chips, potato chips, hot dogs, nuts, or pretzels.

It appears, then, that today's parents are very concerned about their children's diets and that they are trying to limit their children's consumption of foods with problem ingredients while increasing their consumption of "natural" foods.

This trend can only be expected to grow stronger as the baby boom parents—who are demanding low-salt, low-sugar, nutritious food products for their infants and toddlers—begin to select main meals and snacks for their growing children. These parents may welcome any new children's snack that can promote either a nutritional advantage or an absence of problem ingredients.

With less time to spend on food preparation, these new parents also will demand convenient foods. In the future, nutritional microwave foods designed specifically for children's snacks or main meals may find a ready market. In fact, we have found that parents consider the microwave oven much safer for children to use than the conventional oven and that older children already are using the microwave oven to prepare their own snacks and main meals.

Finally, the new parents will want information. Because they travel more and thus can't ask questions of their own parents, these first-time parents will need information and advice about bringing up baby. Companies can establish their credibility with these parents by producing television commercials, print advertisements, and brochures that feature nutrition information and advice from the experts.

It would be a good idea to woo the new parents early with information and with wholesome, convenient, high-quality products for their young children so that they will remain loyal as their children grow older. For it is the baby boom parents who will determine the direction and the dominant products of the children's food market. It is the new parents who will shape the food preferences of their children—preferences that these large numbers of "echo boomers" will carry with them into adulthood.

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*Dr. Sloan is Director of the Good Housekeeping Institute, the major editorial service and technical division of Good Housekeeping magazine.*

# A GREAT YEAR FOR CAPITAL SPENDING

*Capital spending rebounded in 1984. The top 40 food companies spent over 9% more than they did in 1983. The top ten were more lavish. Lead by Anheuser-Busch and Coca-Cola, the top ten spent 23% more.*

There's nothing wrong with a little shakeup now and then. Maybe the Bluejays could make it to the World Series. Or the Buffalo Bills could hit 8-8.

Or someone could outspend Anheuser-Busch.

In what has become an annual event, Anheuser-Busch topped the capital expenditures list for 1984. It also was the top spender in 1983, 1982, 1981, 1980, and 1979. A-B spent $519.2 million last year, $393.1 million for brewing operations alone. In the last five years, $2.3 billion was spent company wide. That's nearly as much as the top ten combined.

What makes A-B more impressive is knowing the rest of the industry was hardly frugal last year. For the first time in years, capital spending rose—jumped is more appropriate. Food companies spent 9.1% more last year. In comparison, spending was down 0.2% in 1983.

In 1984, the top 40 companies spent $5.12 billion versus $4.69 billion in 1983. The top ten spent $2.92 billion last year, a huge 23.1% increase over the year before.

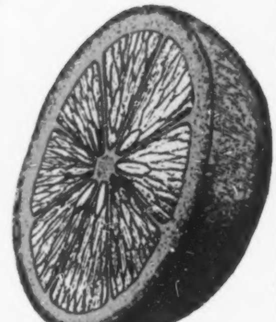
As a whole food did not spend as heavily as other industries. According to the Department of Commerce, capital spending was up an average 16% for all industries. In its survey, DOC estimates food expenditures rose 13%. The only other industry that did worse (in the nondurable goods category) was petroleum with a 10.2% increase over 1983.

Why did food companies spend more? An obvious explanation is the lower and more stable interest rate. Never over the last three years have interest rates been so dependable.

Another reason is the changing tax structure. Companies want to take advantage of known tax breaks before the law changes, if indeed it does. Department of Commerce figures support this theory. DOC did three estimates showing what spending will be like in 1985. Figures for food companies show the percentage increase to be 8.2%, 8.7%, and 9.2% over 1984. According to DOC, "The three most recent surveys suggest that some spending originally planned for the first quarter of 1985 may have been postponed. Uncertainty in the investment outlook could have prompted such a postponement. In the first quarter, corporate cash flow increased strongly and interest rates continued to decline. Real final sales of GNP were flat. Corporate profits and manufacturing capacity utilization rate also declined. Proposed changes in tax laws also contributed to the uncertain investment picture."

An interesting concentration took place in 1984. The top ten companies are expending a greater percentage of the total. Last year, the top ten spent 57.1% of the total $5.12 billion. In 1983, the top ten spent 50.6%. No doubt the mergers are an underlying cause.

So is the new products rush. Nearly all the companies listed in this year's survey used capital expenditures to support new products. Procter & Gamble is a good example. Citrus Hill Orange Juice was introduced in November, 1983, and took off in 1984. In Indiana, Iowa, and Massachusetts test markets, the total orange juice segment jumped 23% after Citrus Hill was introduced, according to P&G. Sold nationally for six months, Citrus Hill has become the second most popular national brand of frozen orange juice concentrate. That kind of



Coke introduced nine products in aseptic packages last year. Nearly $40 million was spent on aseptic production capacity.

growth needs capital.

The 1983 beverage triumvirate of A-B, Coca-Cola, and PepsiCo was broken up in 1984. CPC International's $310.6 million expenditures qualified it for third place. Nabisco's $302.8 million earned it fourth. Pepsi came in fifth with $272.5 million.

There were a few other surprises. Flowers Industries, Inc., made it to the 33rd spot. The specialty foods company had an exceptional year—sales grew 15% to $603 million, and earnings climbed at a 15% compounded annual rate. Quaker Oats reappeared as a top spender after dropping off the ranking in 1983. And Ocean Spray made the 31st spot.

### Who spent what

What did Anheuser-Busch get for its $510.2 million? Several areas of the Houston, Tex., brewery were expanded in anticipation of sales growth. When complete, the project will add about 5 million barrels, bringing A-B's total capacity to 75 million barrels. It sold an industry-leading 64 million barrels in 1984. Site work began on a plant in Fort Collins, Col. The final decision will depend on the market. Over $100 mil. was spent to modernize other breweries.

Coke leaned heavily on aseptic production. It spent $40 million on lines for various *Minute Maid* flavors as well as *Hi-C* and *Five-Alive.* That's on top of the $20 million Coke poured into aseptic equipment in 1983.

CPC International continued to increase its HFCS production capacity. The Argo, Il., plant was completed, and expansion continued at other facilities. Around $350 million will be spent by the end of 1985.

Nabisco built a $42 million research center in New Jersey. It also introduced a host of new products in 1984—again, products that required support in terms of new technology and equipment. These include: *Oreo "Big Stuf"* Cookies, (giant three-inch cookies); *Chewy Chips Ahoy!* cookies; the *Almost Home* cookies line; *Easy Cheese,* a new name and package for *Snack Mate* pasteurized cheese; Luscious Lime and Bananaberry Split flavors for *Bubble Yum* chewing gum (made with a new coextrusion process); *Bonkers!* fruit candy; and *Fleischmann's Squeeze* liquid margarine.

Finally, PepsiCo opened its ultra-modern Casa Grande, Az., plant for Frito-Lay products. "Ultra-modern" is not overworked in this case. The 112,000 sq. ft. plant can churn out nearly 27 million lbs. of potato, corn, and tortilla chips per year. Pepsi also continued with its quality assurance program, installing over 300 checkweighers at Frito-Lay plants. In packaging, it introduced the three-liter PET bottle, and continued improving *Slice* bottling operations.

## TOP 40 SPENDERS

| Company | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|
| Anheuser-Busch | 1 | 1 | 1 | 1 | 1 |
| Coca-Cola | 4 | 3 | 6 | 2 | 2 |
| CPC International | 5 | 5 | 8 | 7 | 3 |
| Nabisco Brands | 17 | 8 | 5 | 5 | 4 |
| PepsiCo | 2 | 7 | 4 | 3 | 5 |
| General Foods | 6 | 10 | 7 | 4 | 6 |
| R.J. Reynolds | 18 | 21 | 17 | 6 | 7 |
| Procter & Gamble | 21 | 30 | 19 | 28 | 8 |
| Kellogg's | 12 | 14 | 15 | 10 | 9 |
| Beatrice | 8 | 11 | 9 | 17 | 10 |
| Campbell Soup | 10 | 16 | 12 | 8 | 11 |
| Nestle | -- | -- | 22 | 16 | 12 |
| Archer-Daniels-Midland | 7 | 2 | 11 | 13 | 13 |
| Adolph Coors | 14 | 13 | 25 | 11 | 14 |
| H.J. Heinz | 16 | 17 | 20 | 14 | 15 |
| Dart & Kraft | 11 | 18 | 16 | 21 | 16 |
| General Mills | 22 | 19 | 14 | 15 | 17 |
| Hershey Foods | 28 | 20 | 18 | 20 | 18 |
| Philip Morris | 3 | 4 | 3 | 9 | 19 |
| Borden | 27 | 29 | 30 | 22 | 20 |
| Consolidated Foods | 9 | 12 | 13 | 23 | 21 |
| Pillsbury | 32 | 28 | 29 | 24 | 22 |
| Quaker Oats | 25 | 15 | 24 | -- | 23 |
| Seagram | 26 | 24 | 23 | 25 | 24 |
| The Federal Co. | 39 | 46 | -- | 30 | 25 |
| ConAgra | 42 | 38 | 45 | 12 | 26 |
| A.E. Staley | 19 | 6 | 2 | 29 | 27 |
| Agway | -- | -- | -- | 31 | 28 |
| IC Industries | 41 | 34 | 33 | 33 | 29 |
| Ralston Purina | 20 | 9 | 10 | 26 | 30 |
| Ocean Spray | -- | -- | -- | -- | 31 |
| G. Heileman | 37 | 35 | 49 | 34 | 32 |
| Flowers | -- | -- | 32 | -- | 33 |
| Tyson Foods | -- | 43 | 43 | 49 | 34 |
| Lipton | -- | -- | -- | 47 | 35 |
| Central Soya | -- | 39 | 40 | 46 | 36 |
| American Brands | -- | -- | 41 | 38 | 37 |
| Castle & Cooke | 40 | 40 | 50 | 40 | 38 |
| General Cinema | -- | -- | 36 | 35 | 39 |
| United Brands | -- | -- | 41 | 38 | 40 |

## 1 Anheuser-Busch St. Louis, Mo

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 519.2 | 346.2 | 50.0 |
| Net Sales | 6,501 | 6,034 | 7.7 |
| Net Earnings | 391.5 | 346.2 | 13.1 |
| Estimated 1985 Spending: $550 million | | | |

Continued expansion of the Houston brewery scheduled to add five million barrels to capacity. Modernization projects totaling $100 million are underway at Newark, NJ., plant and St. Louis brewery. Site work began on Fort Collins, Col., brewery, and will progress depending on sales.

## 2 Coca-Cola Atlanta, GA

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 334.5 | 282.7 | 18.3 |
| Net Sales | 6,479 | 5,980 | 8.3 |
| Net Earnings | 553 | 511.5 | 8.1 |
| Estimated 1985 Spending: NA | | | |

Spent nearly $40 million on aseptic production of Minute Maid juices and new flavors of Hi-C and Five Alive. Packaging took high priority in other areas as well. Bag-in-box, non-returnable fountain syrup packaging systems were adapted for food service.

## 3 CPC International Englewood Cliffs, NJ

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 310.6 | 187.4 | 65.7 |
| Net Sales | 4,373 | 4,011 | 9.1 |
| Net Earnings | 193.4 | 136.2 | 42 |
| Estimated 1985 Spending: over $300 million | | | |

Over $180 million spent to improve corn wet milling operations. The Argo, Ill plant was completed. Work began on a second European wheat processing facility in Sas van Gent, the Netherlands. A 50% expansion was completed at the Winston-Salem, NC plant.

## 4 Nabisco Brands New York, NY

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 302.8 | 240.9 | 25.7 |
| Net Sales | 6,253 | 5,985 | 4.5 |
| Net Earnings | 308.9 | 322.6 | −4.2 |
| Estimated 1985 Spending: $300 million | | | |

Construction continued on $42 million research center in New Jersey. Three-year modernization program began at Franklin Park, IL., candy bar facility.

## 5 PepsiCo Purchase, NY

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 272.5 | 273.9 | −0.51 |
| Net Sales | 5,618 | 5,370 | 4.6 |
| Net Earnings | 155.1 | 212.9 | −27 |
| Estimated 1985 Spending: NA | | | |

Frito-Lay's Casa Grande, Az plant opening in August, 1984, the fastest start-up of any Frito-Lay plant. Roughly 300 checkweighers were added companywide. O'Gradys potato chips were rolled out nationally and hit $100 million in sales.

## 6 General Foods White Plains, NY

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 266.7 | 266.1 | 0.22 |
| Net Sales | 8,600 | 8,256 | 4.2 |
| Net Earnings | 317.1 | 288.5 | 9.9 |
| Estimated 1985 Spending: Same as 1984 | | | |

Investment continued in technology for Maxwell House Coffee Division, especially for the decaffeination process. New packaging lines include vacuum-pack brick for Master Blend and a foil package for Bird's Eye vegetables.

## 7 R.J. Reynolds Winston-Salem, NC

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 246 | 206 | 19.4 |
| Net Sales | 4,698 | 4,491 | 4.6 |
| Net Earnings | 391 | 334.6 | 17.1 |
| Estimated 1985 Spending: Around $90-million over three years | | | |

Continued program to upgrade Kentucky fried Chicken restaurants, Del Monte facilities, and Heublein plants. Heublein will build a pilot plant to expedite new product introductions. Future expenditures will include improvements to the newly acquired Canada Dry plants.

## 8 Procter & Gamble Cincinnati, OH

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 234 | 116 | 101.7 |
| Net Sales | 2,416 | 2,249 | 7.4 |
| Net Earnings | 91 | 117 | −17.8 |
| Estimated 1985 Spending: Somewhat higher | | | |

Capital projects supported new products. Duncan Hines Chocolate Chip Cookies and Citrus Hill Orange Juice both required market and capital funding. Citrus Hill became the second most popular brand in six months. Note--earnings are before taxes.

## 9 Kellogg Battle Creek, MI

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 228.9 | 156.7 | 46.0 |
| Net Sales | 2,602 | 2,381 | 9.3 |
| Net Earnings | 250.5 | 242.7 | 3.2 |
| Estimated 1985 Spending: NA | | | |

Buildings completed and equipment installed for Project 2000, an advanced cereal technology plant in London, Ont. Expansion began at the Lancaster, Pa., cereal plant. Improvement plan began at Mrs. Smith's Frozen Foods in Pottstown, Pa. New plant purchased in Elma, NY for yogurt.

## 10 Beatrice Foods Chicago, IL

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 208 | 211 | −1.4 |
| Net Sales | 7,304 | 7,216 | 1.2 |
| Net Earnings | 545 | 537 | 1.5 |
| Estimated 1985 Spending: Expected to increase | | | |

Capital expenditures went toward upgrading facilities and improving operations.

CPC International spent over $300 million to meet rising demand for high fructose corn syrup. It will do the same in 1985.

*H*.J. Heinz increased capital spending by 16%. The Fremont, Ohio plant was expanded by 32,000 sq. ft., for three #10 ketchup pouch-filling machines.

## 11 Campbell Soup Camden, NJ

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 183 | 154 | 18.8 |
| Net Sales | 3,657 | 3,292 | 11.1 |
| Net Earnings | 191.2 | 165.0 | 15.9 |
| Estimated 1985 Spending: $165 million (Campbell, US.) | | | |

Completed the $8 million Dublin, GA., mushroom growing plant. Added a $9 million LeMenu production line at the Sumter, SC plant. Built a new Plastics Research Center in Moorestown, NJ for plastic containers.

## 12 Nestle' White Plains, NY

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 175.7 | 122.5 | 43.4 |
| Net Sales | 3,116 | 2,508 | 24.2 |
| Net Earnings | 149.5 | 113.2 | 32.1 |
| Estimated 1985 Spending: NA | | | |

Expenditures went for new plant construction including Stouffer's plant in Gaffney for frozen foods and a chocolate/confectionery plant in Fulton.

## 13 ADM Decatur, IL

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 150.5 | 147.7 | 1.9 |
| Net Sales | 4,907 | 4,292 | 14.3 |
| Net Earnings | 117.7 | 110.2 | 6.8 |
| Estimated 1985 Spending: NA | | | |

Expanded capacity without adding new plants through technology. Completed expansion at Lincoln, NE., and began energy conservation projects at Augusta, GE., Kershaw, SC., Fremont, NE., Little Rock, Ark., Clarksdale, MS., and Galesburg, Il.

## 14 Adolph Coors Golden, CO

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 138.8 | 155.7 | −10.9 |
| Net Sales | 1,133 | 1,110 | 2.1 |
| Net Earnings | 44.7 | 89.3 | −49.9 |
| Estimated 1985 Spending: $110 million | | | |

Completed a $70 million European style malthouse. Its circular shape makes it energy efficient and allows greater automation. Added a 420 keg per hour packaging line. Opened the Golden Recycle Company in Col., to produce 400,000 lbs of coil stock per week from used aluminum cans.

## 15 H.J. Heinz Pittsburgh, PA

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 137.0 | 111.4 | 22.9 |
| Net Sales | 3,934 | 3,738 | 5.2 |
| Net Earnings | 237.5 | 214.3 | 10.8 |
| Estimated 1985 Spending: NA | | | |

A high-speed line was installed at the Fremont, OH., plant to triple capacity of 3-gallon metallized ketchup bags for food service. Alos added filling and packaging lines for squeezable ketchup and barbeque sauce bottles. Completed first phase of Burly, Ind., facility.

## 16 Dart & Kraft Glenview, IL

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 107.9 | 95.3 | 13.2 |
| Net Sales | 6,838 | 6,660 | 2.7 |
| Net Earnings | 319.5 | 252.8 | 26.4 |
| Estimated 1985 Spending: NA | | | |

Capital expeditures made in the following ratio: 66% for improving efficiency and facility replacement, 33% for expansion. Increased production capacity for fast-selling Light n' Lively lowfat yogurt.

## 17 General Mills Minneapolis, MN

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 103.2 | 130.3 | − 20.8 |
| Net Sales | 2,771 | 2,713 | 2.1 |
| Net Earnings | 47.1 | 130.7 | − 136.0 |
| Estimated 1985 Spending: $250 million (company wide) | | | |

Earnings reflect a major restructuring program. Two divisions, Consumer Foods and Restaurants, now make up 90% of the company. Expenditures next year will go toward expanding the capacity of the Consumer Foods division.

## 18 Hershey Foods Hershey, PA

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 87.1 | 105.3 | −17.3 |
| Net Sales | 1,893 | 1,706 | 11.0% |
| Net Earnings | 108.7 | 100.2 | 8.5 |
| Estimated 1985 Spending: About the same | | | |

Installed a new line to make Reese's Peanut Butter Chips. Improved the production capacity of Hershey's Miniatures and Kisses.

## 19 Philip Morris New York, NY

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 79.0 | 155.9 | − 49.3 |
| Net Sales | 3,662 | 3,572 | 2.5 |
| Net Earnings | 235.6 | 248.7 | 5.3 |
| Estimated 1985 Spending: NA | | | |

Modernized processing facilities. Installed bottling equipment to handle the King Kan for Miller Beer. Also installed support equipment for the three-liter PET bottle for Seven-Up.

## 20 Borden New York, NY

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 78.4 | 94.6 | − 17.1 |
| Net Sales | 3,120 | 2,969 | 5.1 |
| Net Earnings | 130.6 | 131.7 | −0.83 |
| Estimated 1985 Spending: NA | | | |

Packaging updated on several products, including Bama Jams and Jellies and Frostal aseptically packaged flavored drinks. Metzger Dairy, Dallas, Tx., modernized and expanded. New ice cream plant under construction in Houston. Four major potato chip processing projects underway.

## 21 Consolidated Foods
Chicago, IL

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 76.2 | 113.8 | −33.0 |
| Net Sales | 3,336 | 3,186 | 4.7 |
| Net Earnings | 89.6 | 82.9 | 8.1 |

Estimated 1985 Spending: NA

**Acquisitons include Jimmy Dean Meat Company in Dallas, the Buring Food Group in Memphis, Tenn., Poultry Specialties, Peck Red Meat Packing, and a processing facility in Los Angeles.**

## 22 Pillsbury
Minneapolis, MN

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 73.2 | 69.6 | 5.2 |
| Net Sales | 2,489 | 2,280 | 9.2 |
| Net Earnings | 101.3 | 85.9 | 17.9 |

Estimated 1985 Spending: $88 million

**A Haagen-Dazs ice cream plant is under construction in Tulore, Cal. New Toaster Strudel and Milk Break production lines were installed. A vegetable processing plant is underway in Mexico as well.**

## 23 Quaker Oats
Chicago, IL

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 71.1 | 94.2 | −24.5 |
| Net Sales | 2,758 | 2,561 | 7.7 |
| Net Earnings | 122.7 | 106.2 | 15.5 |

Estimated 1985 Spending: NA

**Quaker used capital expenditures to improve and modernize plant operations**

## 24 Seagram
Montreal, Canada

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 68.3 | 90.2 | −24.3 |
| Net Sales | 2,648 | 2,826 | − 6.3 |
| Net Earnings | 119.4 | 113 | 5.7 |

Estimated 1985 Spending: NA

**Began testing an EDI system in its distribution system. Distillers place orders directly to seagram via a hand-held computer terminal carried by salesmen.**

## 25 The Federal Co.
Memphis, TN

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 61.6 | 51.4 | 19.8 |
| Net Sales | 1,282 | 1,304 | −1.7 |
| Net Earnings | 35.6 | 41.4 | −13.4 |

Estimated 1985 Spending: $40 million

**Replaced vehicles at all plants. Acquired three protein blending plants. Added $6.5 million worth of production and frozen storage space to Holly Farms. Modernized and installed a new grain elevator at Dixie Portland's Barnesville, Ga flour mill.**

## 26 ConAgra
Minneapolis, MN

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 56.6 | 112.7 | −49.8 |
| Net Sales | 3,568 | 1,432 | 149.2 |
| Net Earnings | 59.5 | 28.7 | 108.7 |

Estimated 1985 Spending: NA

**Outlays were made to add volume, increase capacity, and support dozens of new products including: 31 new or retaged banquet entrees; Light & Elegant premium entrees, Armour's Classic Lite line, and Country Skillet Catfish products.**

## 27 A.E. Staley
Decatur, IL

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 54.6 | 50.4 | 8.3 |
| Net Sales | 2,140 | 1,679 | 27.5 |
| Net Earnings | 36.6 | 13.7 | 167 |

Estimated 1985 Spending: NA

**Finished expansion of the Loudon, Tn., plant, which will add 200 million pounds to HFCS capacity. Morrisville added roll dryer capacity for starches. Modernization continued to the Decatur starch production process.**

## 28 Agway
Syracuse, NY

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 48.4 | 37.9 | 27.7 |
| Net Sales | 1,736 | 1,677 | 3.5 |
| Net Earnings | 11.8 | 9.7 | 21.6 |

Estimated 1985 Spending: $23.3 million

**H.P. Hood neared completion with its largest dairy processing facility in Charlestown, Ma. A 2½ year R&D and processing equipment program to develop a long shelf life shake and sundae mix was completed and is fulfilling volume and profit expectations.**

## 29 IC Industries
Chicago, IL

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 45.4 | 36.6 | 24.0 |
| Net Sales | 1,561 | 1,542 | 1.2 |
| Net Earnings | 45.4 | 34.3 | 32.4 |

Estimated 1985 Spending: $47 million

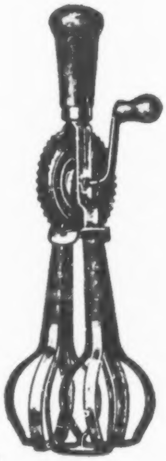
**Completed a $7 million automated equipment installation at Whitman's candy plant, the first phase of a $21 million program. Full production was reached at the Allentown, PA waffle plant. Productivity went up for the fifth consecutive year.**

## 30 Ralston Purina
St. Louis, MO

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 40.4 | 31.2 | 29.5 |
| Net Sales | 1,887 | 1,862 | 1.3 |
| Net Earnings | 92.3 | 97.8 | − 5.6 |

Estimated 1985 Spending: $74 million

**Investments will increase dramatically in 1985 as improvements are made to Continental Baking Co. Support for new products include equipment for Rainbow Brite cereal and Ralston S'mores Chewy Granola Bars.**



General Foods increased its spending by 14% to $302.9 million. Over the last five years, GF has spent $1.3 billion.

*E*xpenditures totaled $107.9 million for Dart & Kraft, an increase of 13.2%. Production capacity for Light n' Lively yogurt increased to match a 40% jump in sales volume.

## 31 Ocean Spray Plymouth, MA

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 40.4 | 21.4 | 88.8 |
| Net Sales | 457.0 | 409.6 | 11.6 |
| Net Earnings | 2.32 | 1.88 | 18.9 |
| Estimated 1985 Spending: will increase | | | |

Four major projects: new cranberry receiving station in Warrens, Wis.; processing system installed at Middleborough, Mass.; new freeze concentrator at Vero Beach, Fla.; and two flexible packaging lines & aseptic systems at Kenosha, Wis.

## 32 G. Heileman La Cross, WI

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 39.6 | 33.8 | 17.2 |
| Net Sales | 1,342 | 1,326 | 1.2 |
| Net Earnings | 45.8 | 57.0 | −19.6 |
| Estimated 1985 Spending: Substantially less | | | |

Completed a $4.2 million expansion of waste water purification plant. The system produces methane gas as a by-product. Other projects increased productivity 87% in 1984.

## 33 Flowers Ind. Thomasville, GA

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 37.5 | 30.1 | 24.6 |
| Net Sales | 603.0 | 522.3 | 15.5 |
| Net Earnings | 22.1 | 19.2 | 15.1 |
| Estimated 1985 Spending: NA | | | |

Over $122 million has been invested in capital expeditures over the last five years by this Fortune 500 company (ranked 446 by sales, 23rd by return to investors) to modernized its 13 plants.

## 34 Tyson Foods Oklahoma City, OK

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 36.4 | 19.8 | 83.8 |
| Net Sales | 750.1 | 603.5 | 24.4 |
| Net Earnings | 18.2 | 11.1 | 64.0 |
| Estimated 1985 Spending: Will increase | | | |

Continued to expand plants and modernize. Acquired mexican Original Products, Fayetteville, Ark., a maker of authentic Mexican tortillas, taco shells, tostadas, and tortilla chips.

## 35 Lipton Englewood Cliffs, NJ

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 35.7 | 22.2 | 60.8 |
| Net Sales | 1,138 | 1,006 | 13.1 |
| Net Earnings | 71.0 | 64.5 | 10.1 |
| Estimated 1985 Spending: NA | | | |

Continued to work on computerization of key production facilities to insure high product quality.

## 36 Central Soya Fort Wayne, IN

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 35.6 | 23.4 | 52.1 |
| Net Sales | 1,728 | 1,513 | 14.2 |
| Net Earnings | 21.9 | 25.2 | −13.1 |
| Estimated 1985 Spending: NA | | | |

Completed expansion of the Decatur, Ill. shortening plant. Added edible oil refining capacity to the Bellevue, Ohio plant.

## 37 American Brands New York, NY

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 34.8 | 28.9 | 20.4 |
| Net Sales | 740.2 | 720.5 | 27.3 |
| Net Earnings | 43.8 | 41.3 | 6.1 |
| Estimated 1985 Spending: $33.9 million | | | |

Equipment to handle several new products, including: Sunshine American Heritage line of crackers; Chips'n middles cookies; and Squiggles, a promising potato-based snack.

## 38 Castle & Cooke Honolulu, HA

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 34.0 | 27.1 | 25.5 |
| Net Sales | 1,521 | 1,362 | 11.7 |
| Net Earnings | 76.7 | 49.7 | −254.3 |
| Estimated 1985 Spending: $34 million | | | |

C&C merged into Flex-Van Corp., a transportation leasing company on March 12, 1985. Capital expeditures will be used to upgrade production equipment.

## 39 General Cinema Chestnut Hill, MA

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 32.7 | 32.5 | 0.6 |
| Net Sales | 512.7 | 473.1 | 8.4 |
| Net Earnings | 66.7 | 63.1 | 5.7 |
| Estimated 1985 Spending: Small increase | | | |

Improved plant efficiency and operations. Heavy commitment was made to upgrading vending. Sold over four billion individual servings last year.

## 40 United Brands New York, NY

| | 1984 | 1983 | % Change |
|---|---|---|---|
| Capital Expenditures | 31.5 | 19.2 | 64.1 |
| Net Sales | 3,155 | 2,277 | 38.6 |
| Net Earnings | 43.4 | 158.2 | 127.6 |
| Estimated 1985 Spending: NA | | | |

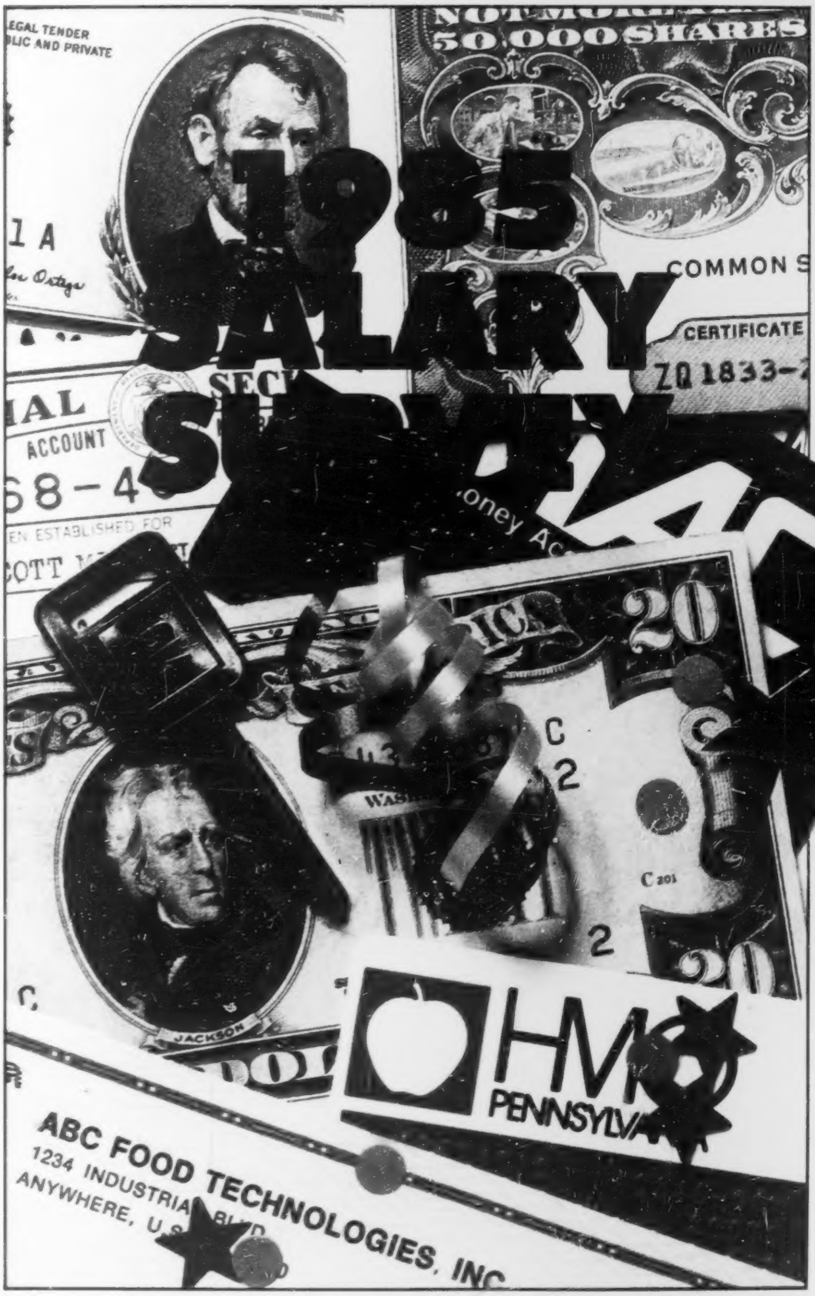
Opened new dehydrated soup plant in Costa Rica. pioneered a container service to ship 50% more Chiquita bananas per week. Continued palm oil projects.

C2150-

DECEMBER 1985

# Chilton's Food Engineering

In this issue: **FOOD PACKAGING**


1985 SALARY SURVEY
LEGAL TENDER PUBLIC AND PRIVATE
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## THE MONEY GAME

*How does your salary compare to the rest of the food industry? The results of this exclusive survey show overall you have reason to celebrate.*

## ARTIFICIAL INTELLIGENCE

*When a 32 year veteran of Campbell Soup's retort room retired, the company retained his experience with AI, turning soup-making into more of a science.*

# Chilton's Food Engineering

**ABOUT THE COVER**

*Food Engineering's* exclusive 1985 salary survey polled 8,000 food industry employees. The results may surprise you. Average salary increases matched those of other industries, a positive upward turn for food industry compensation.

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**FOOD ENGINEERING®** (ISSN 0193-323X) December 1985, Vol. 57, No. 12. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office.

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## News

**14 Lowering commodity costs**

In an effort to trim the U.S. deficit, Congress may soon pass a controversial measure that will, at least temporarily, lower commodity costs and work to reduce surplus commodity stores. The measure is the 1985 Farm Bill, a hotly contested piece of legislation that will slowly chip away at federal farm subsidies.

**21 Beatrice may go private**

As this issue goes to press, Beatrice Companies, Inc. is discussing an unsolicited $5.12-billion leveraged buyout bid with the New York investment firm Kohlberg, Kravis Roberts & Co. If the deal materializes, it will be the biggest leveraged buyout in history.

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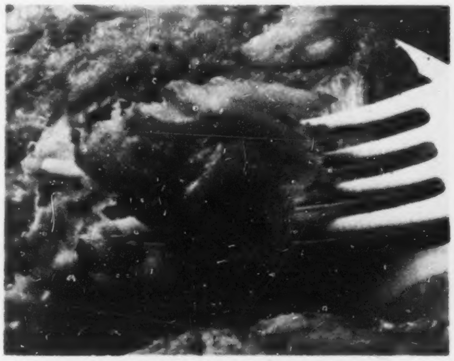

**NEW SPICE, OLD COMPANY:** Baltimore Spice Co. has added *Crab Cake Classic* to its line of Old Bay Seasoning, the first new line addition in 40 years. **PAGE 33**

## Features

**61 1985 Salary Survey**

For *Food Engineering's* 1985 salary survey, the responses of more than 2,000 respondents were tabulated to determine how people in the food industry fared in 1985 in terms of salaries and other types of compensation. The results surprised our editors—and may surprise you, too.

**69 Artificial Intelligence**

When a retort expert retired at Campbell Soup, his expertise was preserved on a computer. The project is Campbell's first practical application of AI.

**75 Food & Dairy Expo**

The Food & Dairy Expo held in Atlanta featured more than 15,000 attendees, of whom 8,500 were food processors. The show's 400 booths displayed a broad range of equipment and supplies for the food and beverage industries.

**ARTIFICIAL INTELLIGENCE:** Campbell Soup's first practical application of AI was the preservation of vital expertise when a veteran retort expert retired. **PAGE 69**

## Food Packaging

**43 COEX '85**
*Food Engineering's* report from COEX '85 surveys new trends and developments in barrier plastics.

**46 Tamper Evidence**
At the Food & Dairy Expo, zip-off rings, shrinkable overwraps and shrink bands were shown as tamper evident closures for dairy products.

**50 Liquid Packaging**
Aseptic packaging, hot-fill pouches and the first U.S. pouch pack system for milk were highlighted at the Food & Dairy Expo.

**54 Dual-Ovenable Trays**
Ralston Purina's new line of *Heat-at-Home* entrees and side dishes are being offered in dual-ovenable polyester trays.

**56 Literature**

Miracle Whip
SQUEEZABLE
Campbell's
Chicken Soup
Broad Egg Noodles
READY TO SERVE

**IT'S A REVOLUTION:** The COEX '85 packaging conference explored the trend toward the increased use of barrier plastics in packaging. *FE* brings you up-to-date. **PAGE 43**

## New Equipment

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### Field Reports

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**121** Labor, space savings with this container

**REWORKING A NEW WAY:** Urschel Laboratories' help solve a biscuit manufacturer's reworking problems. Quality control, efficiency and savings were the result. **PAGE 92**

*Special Emphasis*

**PROCESSING EQUIPMENT & CONTROLS:**
Everything from programmable process controls to a ceramic microfilter for liquid/solids separation is featured in this month's special focus on Processing Equipment & Controls in the new product section.
**Pages 89 to 94**

**COMPENSATION**/HOW DO YOU RANK?

# 1985 SALARY SURVEY

*Are you better off this year than last year? You say "No," but the numbers say otherwise. With inflation down, and salary increases keeping pace with other industries, food industry people are doing just fine.*

When *Food Engineering* first started reading the returns of the 1985 salary survey questionnaires, the first impression was that there is a lot of anger in the workplace. The anger is not only over salaries and upcoming salary increases, but also a variety of other compensation-related factors. When we kept reading it became clear that the comments weren't reflecting anger or rage, but rather a sense of frustration.

The frustration seems to stem from a number of reasons—low starting salaries, low salary increase percentages, anger at higher salaries paid to upper management and, more and more, great frustration at the discrepancies between male salaries and those paid to females performing the same functions.

Another great source of unhappiness is in the area of benefits packages. Some employers are taking into consideration the increased costs of providing benefits for their employees when determining percentage increases for their staffs.

## Is the frustration justified?

Yes....and no.

Certainly there are instances where all of the frustrations above are valid. But industry-wide they don't seem to hold water, especially in the area of salary increase percentages.

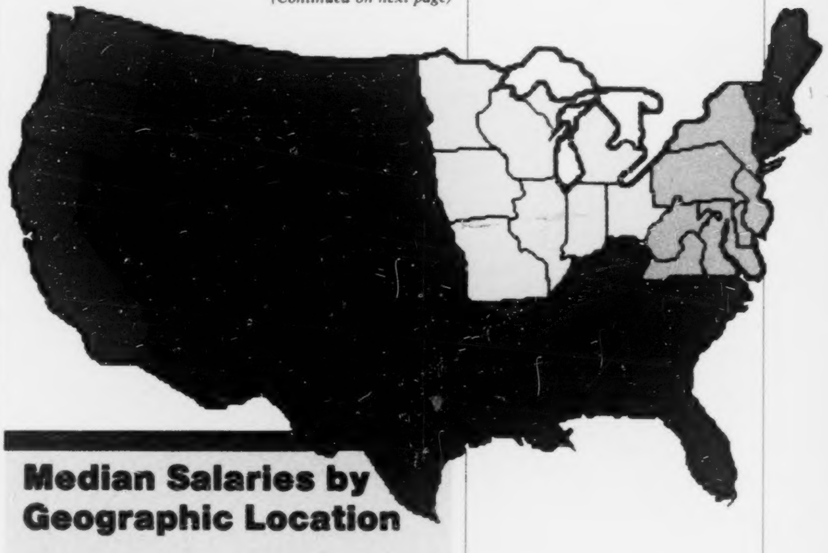
In our present economy where salaries are rising at the rate of about 5-6%, the food industry fits right into the norm. Combined with an inflation rate of 6% or less for 1985, a smaller salary increase actually results in more spendable income than the double digit increases of past years.

Our respondents told us they were realizing about 5% increases in 1985. Almost without exception the respondents to our survey were making more money this year than last. If this is a representative cross-section of the food industry, then indications point to the fact that food industry people are doing just fine in 1985.

True, there are executives who are reaping the rewards of an improved economy, with salary increases in double digits and other

*(Continued on next page)*

*LINDA K. FREEMAN*
*Managing Editor*



## Median Salaries by Geographic Location

| Geographic Location | Median Salary | % Increase '84-'85 |
|---|---|---|
| New England | $44,000 | 13.4 |
| Middle Atlantic | 38,800 | 8.3 |
| South Atlantic | 43,700 | 30.0 |
| Deep South | 38,100 | 33.2 |
| North Central | 38,400 | 17.8 |
| Plains States | 37,300 | 16.6 |
| Rocky Mountain | 38,000 | 33.3 |
| Southwest | 44,500 | 31.7 |
| West Coast | 41,500 | 26.5 |
| Outside Cont. U.S. | 41,600 | 12.4 |

**Median salaries were used for all charts accompanying this article. These do not indicate size of company, employees supervised or other factors affecting compensation. The salaries indicated should be used only as guidelines.**

## About the survey

In August *Food Engineering* mailed out 8,000 questionnaires to a representative cross-section of the food industry. More than 2,000 people responded, an increase of more than 600 from last year.

For the purposes of this survey, responses were tabulated to show the median of each classification. The findings reflect the middle number in a classification, offering a more statistically accurate figure than an "average" number. Widely divergent salaries do not affect a median number, but they do significantly affect an average number.

What had a major effect on this year's survey is not how many people responded, but rather *who* responded.

In looking at the percentage increases shown on the charts the numbers are striking—33%, 25%—double digit percentages are the rule, not the exception.

Our results reflect that *according to the respondents to Food Engineering's survey,* percentage salary increases were higher in the past year.

For example, looking at the large chart, last year only 5.6% of the respondents in the vice president, R&D category made more than $100,000. This year the figure was 21.3%. If you look at the same classification, last year 5.6% made $25-$29,999, this year there was not a single response. It means that R&D vice presidents *who responded to Food Engineering's survey* made more than those who responded to the 1984 survey.

forms of executive compensation growing. But they are not representative of the industry as a whole. And, although several of our respondents were in the 3% increase range, this, too, appears to be the exception and not the rule.

### What the numbers show

The numbers show that most of the industry did well. At least as well as other industries in the U.S. It's true that our responses showed that those in the Middle Atlantic region had the lowest increase, somewhat below the norm, but everywhere else the numbers are good.

Those in the pasta industry showed a decline, but seafood and confectionery, beverages, meats and most others did very well indeed.

And while most of the respondents to our survey showed a healthy increase from 1984 to 1985, engineering managers, project engineers and chemists lagged a bit behind.

Overall, however, if you're in the food industry, you're doing O.K. Sure, you may not be getting double digit salary increases, but, then again, neither is most of the rest of the working world. With five straight months of 0.2% monthly increase in the Consumer Price Index, inflation is slowing down, a boon to our paychecks. The *Philadlephia Inquirer* described inflation as "modest over the past 12 months" and the newspaper feels it "is no longer a major factor in the U.S. economy.

### You have your say

The survey questionnaire gave each respondent an opportunity to "get it off his chest" and express personal concerns and complaints. Some of you (fewer than 10%) took up the gauntlet and responded, sometimes in anger, sometimes in frustration—and sometimes to say something positive. This would also tend to

## Salary Range by Job Function, Comparing 1984 and 1985

| | VICE PRESIDENT RESEARCH & DEVELOPMENT | | VICE PRESIDENT MARKETING/ SALES | | VICE PRESIDENT MANUFACTURING | | TECHNICAL DIRECTOR | | MARKETING MANAGER | | ENGINEERING MANAGER | | PLANT MANAGER | | SALES MANAGER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** |
| Under 20,000 | — | — | 1.7 | 4.0 | — | 2.1 | 1.2 | 1.8 | 2.2 | 7.3 | — | 1.5 | .8 | 3.0 | — | 6.0 |
| 20-24,999 | — | — | — | 4.0 | — | 2.1 | 2.3 | .9 | 2.2 | 2.4 | 1.0 | 6.0 | .8 | 11.2 | 2.8 | 10.8 |
| 25-29,999 | — | 5.6 | 3.3 | 4.0 | — | 4.2 | 5.2 | 9.4 | 2.2 | 12.2 | 4.9 | 3.0 | 9.6 | 15.3 | 7.4 | 13.3 |
| 30-34,999 | 2.1 | — | 3.3 | 12.0 | 8.7 | 6.3 | 4.0 | 17.0 | 6.7 | 7.3 | 3.9 | 9.0 | 8.8 | 10.2 | 8.3 | 12.0 |
| 35-39,999 | — | 11.1 | 3.3 | 4.0 | 8.7 | 4.2 | 10.4 | 12.3 | 4.4 | 17.1 | 9.7 | 13.4 | 15.2 | 12.2 | 13.9 | 12.0 |
| 40-44,999 | 4.3 | 11.1 | 11.7 | 4.0 | 4.3 | 6.3 | 8.7 | 11.3 | 8.9 | 2.4 | 8.7 | 11.9 | 12.0 | 10.2 | 8.3 | 10.8 |
| 45-49,999 | 6.4 | 16.7 | 5.0 | 10.0 | 4.3 | 12.5 | 11.6 | 17.9 | 13.3 | 22.0 | 19.4 | 23.9 | 12.8 | 16.3 | 9.3 | 12.0 |
| 50-54,999 | 10.6 | 11.1 | 3.3 | 6.0 | 2.2 | 6.3 | 8.1 | 9.4 | 4.4 | 9.8 | 18.4 | 10.4 | 10.4 | 4.1 | 11.1 | 6.0 |
| 55-59,999 | 4.3 | 27.8 | 5.0 | 12.0 | 4.3 | 12.5 | 11.0 | 11.3 | 11.1 | 14.6 | 8.7 | 17.9 | 8.8 | 8.2 | 13.9 | 12.0 |
| 60-69,999 | 14.9 | 5.6 | 15.0 | 14.0 | 17.4 | 14.6 | 13.3 | 1.9 | 22.2 | 2.4 | 12.6 | — | 10.4 | 5.1 | 7.4 | 3.6 |
| 70-79,999 | 17.0 | 5.6 | 13.3 | 8.0 | 17.4 | 12.5 | 9.8 | 2.8 | 8.9 | 2.4 | 2.9 | 3.0 | 4.8 | 1.0 | 6.5 | 1.2 |
| 80-99,999 | 12.8 | — | 15.0 | 2.0 | 15.2 | 4.2 | 6.4 | .9 | 6.7 | — | 4.9 | — | 1.6 | 1.0 | — | — |
| Over 100,000 | 21.3 | 5.6 | 11.7 | 16.0 | 8.7 | 12.5 | 3.5 | .9 | 2.2 | — | 1.9 | — | — | — | — | — |
| No. of Respondents | 47 | 18 | 60 | 50 | 46 | 48 | 173 | 106 | 45 | 41 | 103 | 67 | 125 | 98 | 108 | 83 |

support the statement that food industry employees are content and doing alright in the salary area, or more would have written.

Here is some of what you had to say....

## Increases/percentages

A project engineer (North Central area, making $45-49,999) expressed a common complaint: "Average salary increase is never more than 3%, bonus not more than 3% of annual base. COLA (cost-of-living) is not paid." Here is a person who received a lower salary increase than most, but was awarded a bonus—a luxury few other respondents enjoyed this year.

The comments of another project engineer (Mid-Atlantic area, earning $30-34,999) had frustration in every line: "I feel I am underpaid considering the amount of time, effort and dedication I put into my job. The corporation I work for has lowered all percentages for raises, therefore, morale is not as good as it should be since there are no incentives left for the worker. When the raise does come, it certainly doesn't even come close to covering the cost-of-living increases."

A sales manager making less than $35,000 a year wrote: "Increases have been about 5% per annum for the past 4 years." This respondent, although he lost in past years, is experiencing the industry norm if he receives a 5% increase this year.

When Towers, Perrin, Forster & Crosby, a management consulting firm, surveyed 250 large companies, they found that those companies said salary increases would be in the range of 5.3% for top management, 5.5% for exempt employees and 5.1% for nonexempt. Using these percentages, the salary increase of the sales manager mentioned above is competitive in 1985.

## Median Salaries by Product Specialty

| Product Specialty | Median Salary | % Change '84-'85 |
|---|---|---|
| Fats & Oils | $42,700 | +12.4 |
| Pasta | 29,500 | -14.5 |
| Beverages | 42,000 | +21.7 |
| Grain Mill Products | 39,500 | +14.5 |
| Dairy | 37,200 | +13.8 |
| Seafood | 42,000 | +31.2 |
| Fruits & Vegetables | 38,300 | +20.0 |
| Bakery | 37,500 | +19.0 |
| Confectionery | 38,800 | +26.8 |
| Meat | 38,900 | +31.9 |
| Multiple Categories | 42,400 | +16.2 |
| Categories other than above | 39,500 | +19.0 |

**Within each product classification, the salaries of all job functions have been tabulated. Shown is the median salary from that tabulation. The "multiple categories" classification covers those respondents who checked two or more product specialties.**

These percentages are certainly less than the percentages shown on the charts, even taking inflation into consideration. The discrepancy is understandable looking at who responded to the survey (*see sidebar*).

## A longer wait

A common vein running through the comments was the fact that the period of time between salary increases seems to be getting longer. A number of respondents, representing a variety of locations, positions, and salaries commented that financial reviews are now further and further apart—coming every 15 months rather than the usual 12 months.

*(Continued on next page)*

| PACKAGING MANAGER | | PROJECT ENGINEER | | PRODUCT MANAGER | | TRANSPORTATION/ DISTRIBUTION MANAGER | | SANITATION/ MAINTENANCE MANAGER | | PURCHASING MANAGER | | QUALITY CONTROL MANAGER | | PRODUCTION SUPERVISOR | | FOOD TECHNOLOGIST | | CHEMIST | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** | **1985** | **1984** |
| 1.1 | 13.7 | — | 2.2 | — | 10.0 | 7.7 | 13.6 | 2.6 | 20.0 | 7.4 | 20.5 | 5.0 | 24.3 | 2.7 | 22.3 | 8.0 | 30.8 | 7.0 | 4.5 |
| 5.7 | 8.0 | 3.8 | 13.0 | 8.0 | 3.3 | 7.7 | 13.6 | 15.4 | 6.7 | 8.4 | 17.4 | 14.4 | 16.9 | 17.3 | 24.1 | 15.1 | 17.0 | 15.8 | 23.7 |
| 12.6 | 11.4 | 11.3 | 15.2 | 6.0 | 3.3 | 8.8 | 20.3 | 12.8 | 23.3 | 8.4 | 8.3 | 16.7 | 25.4 | 17.3 | 33.3 | 21.3 | 22.7 | 19.3 | 22.7 |
| 5.7 | 12.5 | 18.8 | 27.2 | 6.0 | 16.7 | 13.2 | 15.3 | 17.9 | 16.7 | 13.7 | 22.0 | 25.0 | 13.8 | 18.7 | 5.6 | 16.9 | 14.8 | 19.3 | 27.3 |
| 13.8 | 17.0 | 16.8 | 17.4 | 18.0 | 40.0 | 15.4 | 10.2 | 20.5 | 16.7 | 10.5 | 7.6 | 11.1 | 7.9 | 17.3 | 5.6 | 16.9 | 11.4 | 10.5 | 4.5 |
| 8.0 | 9.1 | 11.9 | 17.4 | 14.0 | 13.3 | 13.2 | 10.2 | 2.6 | 13.3 | 10.5 | 9.1 | 6.7 | 5.3 | 14.7 | 5.6 | 7.1 | 3.4 | 12.3 | — |
| 13.8 | 10.2 | 13.8 | 5.1 | 24.0 | 6.7 | 4.4 | 10.2 | 7.7 | 3.3 | 8.4 | 5.3 | 4.4 | 2.1 | 2.7 | 3.7 | 3.6 | — | 3.5 | 4.5 |
| 5.7 | 6.8 | 6.9 | 1.1 | 12.0 | — | 11.0 | 1.7 | 7.7 | — | 5.3 | 3.0 | 2.8 | 2.1 | — | — | 1.3 | — | 7.0 | — |
| 12.6 | 6.8 | 3.1 | — | 2.0 | 6.7 | 1.1 | 1.7 | 5.1 | — | 6.3 | 3.8 | 2.2 | 1.1 | 1.3 | — | .9 | — | 3.5 | 9.1 |
| 10.3 | 3.4 | 3.8 | — | 2.0 | — | 5.5 | 1.7 | 2.6 | — | 6.3 | .8 | 3.9 | 0.5 | — | — | .9 | — | — | — |
| 3.4 | — | — | — | — | — | 4.4 | 1.7 | — | — | 1.1 | .8 | 2.2 | — | — | — | .4 | — | — | — |
| 1.1 | — | — | 1.1 | — | — | 1.1 | — | — | — | 4.2 | .8 | .6 | — | 1.3 | — | — | — | — | — |
| — | 1.1 | — | — | — | — | — | — | — | — | — | — | — | 0.5 | — | — | — | — | — | — |
| 87 | 88 | 160 | 92 | 50 | 30 | 91 | 59 | 39 | 30 | 95 | 132 | 180 | 189 | 75 | 54 | 225 | 88 | 57 | 22 |

## Doing more, for less

While salary increases are getting further apart and smaller in size, say the respondents, responsibility in the workplace has increased. For lower salary increases, people are being asked to manage larger staffs, larger budgets, work longer hours...yet wait longer for their increases.

A purchasing manager (Southwest area, earning less than $25,000) wrote: "I am also the accounts payable manager as well as purchasing, also do the monthly Federal Market report and get involved on a daily basis with production reports. The daily schedule is from 8 a.m. to 6:30 or 7:00 p.m. with every Saturday until 1:00 or later and some Sunday work...."

While one respondent wrote that he is paid "overtime for any hours over 9 a day or Saturday-Sunday work," that was certainly not the norm with our respondents.

### Median Salaries by Educational Experience

| Educational Experience | Median Salary | % Increase '84-'85 |
|---|---|---|
| High School or less | $35,300 | 21.7 |
| Some College | 37,000 | 29.8 |
| Bachelor's Degree | 38,400 | 16.7 |
| Master's Degree | 43,900 | 14.3 |
| Ph. D. | 55,200 | 21.3 |

**In 1985, 49.7% of the respondents held Bachelor's degrees, 18% Master's degrees, 6.5% Ph. D.'s, 19.2% had some college experience and 6.4% had a high school diploma, or less.**

### Median Salaries by Job Function

| Job Function | 1985 | 1984 | % Increase |
|---|---|---|---|
| V.P., Manufacturing | $67,300 | $57,300 | 17.5 |
| V.P., Marketing/Sales | 66,000 | 56,000 | 17.9 |
| V.P., Research & Dev. | 72,800 | 53,000 | 37.4 |
| Engineering Manager | 50,300 | 46,000 | 9.3 |
| Marketing Manager | 56,600 | 45,400 | 24.7 |
| Technical Director | 52,300 | 42,800 | 22.2 |
| Plant Manager | 45,400 | 38,000 | 19.5 |
| Sales Manager | 46,800 | 37,800 | 23.8 |
| Product Manager | 42,600 | 36,800 | 15.8 |
| Packaging Manager | 44,500 | 36,100 | 23.3 |
| Project Engineer | 37,700 | 33,000 | 14.2 |
| Transportation/Dist. Mgr. | 37,600 | 30,900 | 21.7 |
| Purchasing Manager | 38,000 | 30,800 | 23.4 |
| Sanitation/Maint. Mgr. | 34,000 | 29,500 | 15.3 |
| Chemist | 31,600 | 28,600 | 10.5 |
| Quality Control Manager | 31,900 | 26,400 | 20.8 |
| Production Supervisor | 32,100 | 25,600 | 25.4 |
| Food Technologist | 30,500 | 25,500 | 19.6 |

Many respondents wrote of increased hours, Saturday and Sunday work, with no additional compensation. A quality assurance supervisor (North Central area, earning less than $25,000) said "(I) am the lowest paid supervisor in my plant. We do not get paid for overtime (after 8 hours) or Saturday work—I rarely work less than 56 hours a week."

## Management is doing well

A technical director earning between $55,000 and $59,999 said: "Upper management well taken care of (by themselves) with good salaries, company cars, stock options, large bonuses, etc. Middle management (directors, managers) have few perks, tenuous job security, have to be satisfied with raises of cost-of-living percentage or less."

Another respondent, a vice president, R&D, (North Central area, making $90-99,999) wrote of what he is experiencing at his end of the salary spectrum. He's also feeling the pinch. He wrote that "salary increases and benefits are being decreased significantly at the present time (over the past 2 years and into the foreseeable future)."

Although someone on the lower end of the payscale might have difficulty shedding a tear for the executive making $90,000 who has suddenly found he's not going to get a 13% increase this year, it's the old adage that "you spend what you make" or get used to having what you have. The $90,000 a year man can feel the lowering of salary and benefits just as the $34,000 food technologist can.

## The benefits factor

Benefits were really a sore point with a lot of respondents. One especially acrimonious senior product food technologist (North Central area, making $30-34,999) had this to say: "This year we had to start paying for medical benefits. We are losing in this area!"

It seems that more and more employers are taking into consideration the rising cost of benefits when computing salary increases. In 1983 benefits accounted for 36.6% of payroll costs. Across the United States, says the U.S. Chamber of Commerce, the total cost of employer-paid benefits was $550 billion in 1983, up from $510 in 1982. The 1984 figure was forecast to be $595 and 1985's figure is expected to reach an all-time high of about $645 billion.

In an article in *Nation's Business*, February 1985, it was pointed out that "No matter the variations, one thing is clear: Over the decades, the rise in the cost of employee benefits has been tremendous. Though hourly workers' benefits increased by 5.5 percent over 1982, their wages increased by only 4.8 percent...." It was also pointed out that from 1951 to 1983 employee wages showed an increase of 502%, but the cost of their benefits to their employers went up more than twice as fast as that. The percentage rise: 1,077.

## The gender gap

The area of male vs. female salaries was one of the most responded-to areas of the survey. It seems that in the food industry, as in most others, women have not been able to shrink the "gender gap."

There were the terse statements of frustration: "A male in my position would be earning $20,000 more per year...." This from a female vice president, marketing/sales earning $35-39,999 in the Mid-Atlantic region.

A marketing manager from the Mid-Atlantic region earning $25-29,999 had this to say: "My male counterpart who has approximately 6 months more experience in marketing but 5 years less work experience is earning $5,000 more than I. Incidentally, he has no Master's either."

A transportation/distribution manager, earning less than $20,000 despite 25 years food industry experience, had this to say: "If I were a male, I would be doing less work and making a whole lot more money. The male who sweeps our floor (union) makes more money than I do...It's still a man's world."

These comments can be supported by looking at the chart "Median Salaries by Job Function, by Gender" that offers graphic illustration of the differences in salaries in this area.

One plus in the area of the discrepancies between male and female salaries is the fact that this year's survey elicited more responses from women in higher positions. Our 1985 responses show that although women may not be keeping pace with men in terms of compensation, they are beginning to climb higher up the corporate ladder into positions of authority.

## Bonuses and incentives

The responses ranged from "none" to company cars, bonuses based on sales, employee stock plans and cash awards. One respondent wrote that he receives a house from his company. Those receiving such bonuses and incentives were, however, definitely in the minority.

One noticeable thing about many of the responses was that there was nothing noted under "other forms of compensation." Not only were there many who receive nothing along this line, but in some cases, as with a production supervisor in the North Central region, such forms of compensation are disappearing. He states: "All bonuses and incentives were stopped as of 7/1/85."

A lab manager, earning less than $30,000 in the Deep South, wrote of a frustrating scenario: "No merit pay, incentives, etc. have been offered to anyone at my level in my company since I have been with them, 1972 to present. In addition, in only one of the past 4 years I received a cost-of-living adjustment."

*(Continued on next page)*

**"Say, honey, read me that part about your company sanitation engineer who gets only thirty-three thou a year...."**

## Median Salaries Vs. Experience

| Years Experience | Total Experience Median Salary | Food Experience Median Salary |
|---|---|---|
| 0-2 | $25,400 | $27,800 |
| 3-5 | 30,200 | 32,200 |
| 6-9 | 33,600 | 35,500 |
| 10-14 | 37,600 | 41,200 |
| 15-19 | 45,900 | 45,800 |
| 20-24 | 47,700 | 47,400 |
| 25-29 | 51,400 | 51,200 |
| 30+ | 50,800 | 52,400 |

## Median Salaries by Job Function, by Gender

| Job Function | Male | Female | Difference |
|---|---|---|---|
| V.P., Manufacturing | $66,800 | -- | $66,800 |
| V.P., Marketing/Sales | 67,500 | $29,000 | 38,500 |
| V.P., Research & Dev. | 74,500 | 44,000 | 30,500 |
| Engineering Manager | 50,200 | -- | 50,200 |
| Marketing Manager | 58,600 | 44,000 | 14,600 |
| Technical Director | 53,100 | 39,000 | 14,100 |
| Plant Manager | 45,600 | -- | 45,600 |
| Sales Manager | 48,400 | 34,000 | 14,400 |
| Product Manager | 43,700 | 37,700 | 6,000 |
| Packaging Manager | 44,500 | 42,000 | 2,500 |
| Project Engineer | 38,100 | 29,500 | 8,600 |
| Transportation/Dist. Mgr. | 38,400 | 23,300 | 15,100 |
| Purchasing Manager | 42,000 | 26,500 | 15,500 |
| Sanitation/Maint. Mgr. | 34,500 | -- | 34,500 |
| Chemist | 33,600 | 23,400 | 10,200 |
| Quality Control Manager | 32,900 | 26,800 | 6,100 |
| Production Supervisor | 32,800 | 24,500 | 8,300 |
| Food Technologist | 33,600 | 26,200 | 7,400 |

***Responses in this area were insufficient to result in a representative figure.**

## Some are content...

From a number of respondents we heard very positive feedback. There were respondents who wrote that they feel they are well compensated for what they are doing. Some wrote that even though they are not making as much as some others in other parts of the country, they are content where they are making what they do in order to live in a specific area of the country. And, of course, there are those who *are* getting bonuses, incentives, company cars, etc., making them pleased with where they are in their professional lives.

One respondent from the Mid-Atlantic area, in writing about the benefits offered at his company, said: "We have a very nice employee stock plan that varies from a low of $.30 to a high of $1.00 for each dollar we contribute." Employee stock ownership plans, matched in varying degrees by the company, featured in a number of responses.

## Who is doing best?

Checking the charts, it seems that the vice president of research and development in a company with 500 or more employees wins the prize for best salary in 1985. Following that classification are the vice presidents of marketing/sales and manufacturing, each with large companies.

If you're not a vice president, though, and few of us are, then the job classifications who made out the best this year were technical director, marketing manager, plant manager and engineering manager. The food technologists, chemists, production supervisors and quality control managers lagged behind.

If you have a choice, you should be working for a large company in the Rocky Mountain area. That area showed a 33.3% increase in salary over last year, followed by the Deep South with a 33.2% increase and the Southwest at 31.7%.

All of this is tempered, of course, with the fact that these figures represent those people we heard from this year, as opposed to those we heard from last year.

## You're doin' o.k.

If you take all of the comments, again from fewer than 10% of the respondents, and weigh them against the numbers, from our charts, from outside sources, and from the industry, it all points in one direction. Yes, there are some people who are not keeping up with the food industry or with industry overall in terms of salary increases, bonuses, benefits, etc. But for the most part, food industry employees are making out just as well as almost anyone else in the U.S.

Historically this wasn't always the case. Numbers usually showed the food industry lagging behind others in terms of compensation and benefits, but ahead in number of hours worked. This year it appears the food industry is narrowing the gap.

So, although maybe you didn't get everything you wanted this year, you still got enough to be competitive. That's a positive step forward, and hopefully one that will be reflected again in next year's salary survey.

### Median Salaries by Company Size

| Job Function | 1-99 Employees | 100-499 Employees | 500 or More Employees |
|---|---|---|---|
| V.P., Manufacturing | $44,000 | $74,500 | $75,000 |
| V.P., Marketing/Sales | 53,000 | 74,500 | 89,500 |
| V.P., Research & Dev. | 54,000 | 69,000 | 96,800 |
| Engineering Manager | * | 43,300 | 52,500 |
| Marketing Manager | 44,500 | 59,500 | 57,500 |
| Technical Director | 39,500 | 46,300 | 59,500 |
| Plant Manager | 40,800 | 44,500 | 56,500 |
| Sales Manager | 39,000 | 44,500 | 50,700 |
| Product Manager | 38,000 | 42,000 | 44,000 |
| Packaging Manager | 32,000 | 37,500 | 47,600 |
| Project Engineer | 36,300 | 32,300 | 39,500 |
| Transportation/Dist. Mgr. | 34,000 | 32,700 | 42,300 |
| Purchasing Manager | 23,500 | 33,500 | 43,400 |
| Sanitation/Maint. Mgr. | 26,300 | 32,500 | 39,000 |
| Chemist | 28,300 | 39,000 | 32,000 |
| Quality Control Manager | 27,300 | 29,000 | 37,200 |
| Production Supervisor | 28,600 | 32,300 | 33,700 |
| Food Technologist | 31,800 | 26,500 | 31,800 |

### Ten Fastest Growing Benefits Ranked by Percentage Increase In Spending (1973-1983)

| Benefit | % Increase |
|---|---|
| Employee Education Expenditures | 562 |
| Thrift Plans | 332 |
| Insurance (life, hospital, surgical, medical, etc.) | 219 |
| Workers' Compensation | 180 |
| Paid Sick Leave | 152 |
| Old Age, Survivors, Disability, Health Insurance (FICA) | 148 |
| Unemployment Compensation Taxes | 141 |
| Paid Vacations | 115 |
| Payments for Time Not Worked (jury duty, death in family, etc.) | 114 |
| Paid Holidays | 106 |

Source: Nation's Business, February, 1985.

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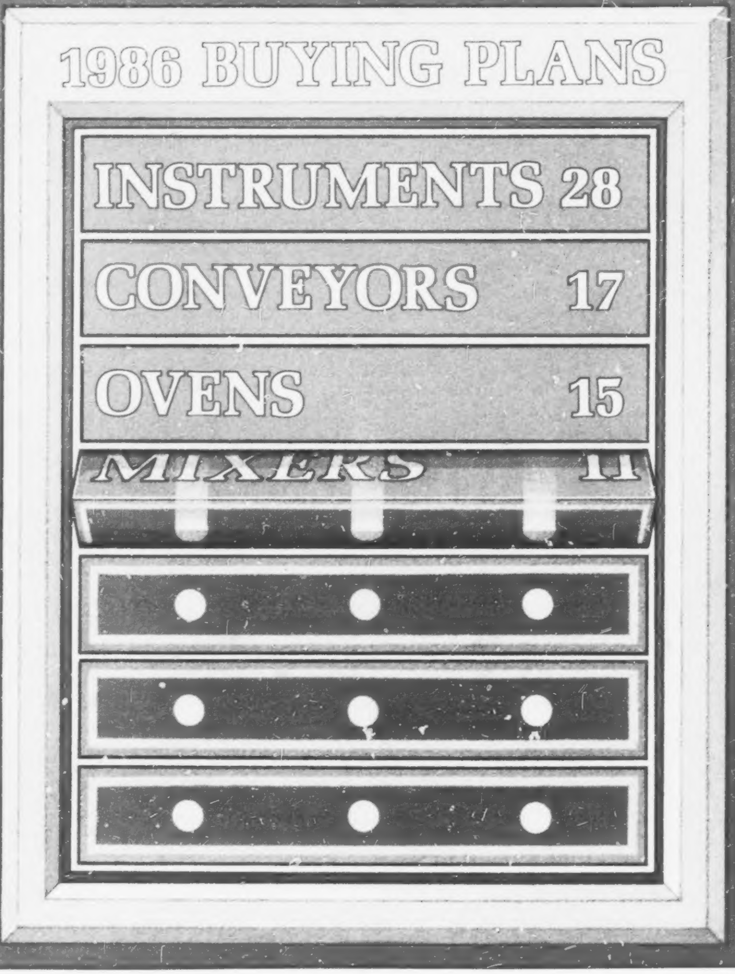
JANUARY 1986

# Chilton's Food Engineering

In this issue: **ENGINEERED FOODS**

## SURVEY SAYS...


1986 BUYING PLANS
INSTRUMENTS 28
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## BUSINESS CONFIDENCE POLL IS UPBEAT

*FE's exclusive survey finds the industry looking for a strong 1986. Also, readers' capital expenditure plans.*

## CONTROLS REVOLUTIONIZE BAKING INDUSTRY

*At Baking Expo '85 FE found a wealth of new products and an industry rapidly moving to automation.*

## PUMPS, VALVES, AND FITTINGS

*Accidents in 1985 revealed just how important this category can be.*

Chilton's
# Food Engineering

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OVENS

**ABOUT THE COVER**

Our survey of food industry executives says: 1986 will be a very good year. We also preview equipment buying patterns for 1986.

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**FOOD ENGINEERING**® (ISSN 0193-323X) January 1986, Vol. 58, No. 1. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office © Chilton Company, 1986. All rights reserved

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Washington lawmakers are deliberating whether to require fat, cholesterol, potassium and sodium labelling on all process foods.

**23 Industry staff realignments**
In the face of the economic realities of today's business environment, several food companies have made major adjustments to their corporate staffs.

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Colorado
Chiller

**CHILLERS STILL A HOT MARKET:** Brewers are becoming a force in wine coolers. Developing products that are malt-based and citrus-flavored. **PAGE 29**

## Features

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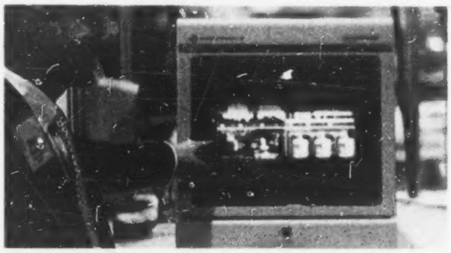
*Food Engineering* has assembled, from across the broad spectrum of the food and beverage industries, 200 executives who will serve as our 1986 Executive Advisory Board. This group of men and women, from a wide range of disciplines, industries, and company sizes, will help us probe trends and buying patterns throughout 1986. This first effort looks at the food industry business climate for 1986 and trends in food processing equipment.

**75 Baking Expo '85**
It only takes place every four years. That's why the International Baking Industry Exposition is significant as a benchmark of baking technology. From computerized process control to robotics the Expo took at look at what's happening, and what's coming.

**79 Pumps, Valves & Fittings**
The special emphasis section of this issue highlights a critical area in any processing operation—pumps, valves and fittings. This issue's buyers' survey found this category will be high on the 1986 shopping list. Here we look at some of the new products buyers can choose.



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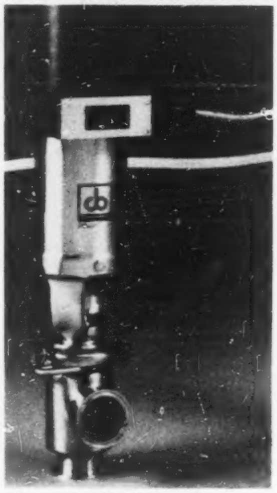


## *Special Emphasis*

**VALVES, PUMPS & FITTINGS:**
Pumps, valves and fittings are constantly being designed and redesigned to fit the ever-changing needs of the food industry. The latest products and trends are detailed in this issue's special emphasis section.

**Pages 79 to 85**

# '86 Commodities Outlook: supplies, up; prices, steady

What's ahead for commodities in '86? The Annual Agricultural Outlook Conference was held in Washington, D.C., December 3-5 and the experts gave us their educated opinions.

James R. Donald, chairman of the USDA's World Agricultural Outlook Board, gave an overview of the current and predicted situation. According to Donald, bumper harvests in many world regions, especially the Soviet Union and the United States, are boosting world crop supplies for the 1985/86 season. Global supplies of coarse grains and oilseeds are especially ample.

Donald says that crop consumption is rising worldwide and ample supplies of feedstuffs are encouraging high feeding rates. Increased production in some importing countries, especially the Soviet Union and China, will cause world agricultural trade to decline in 1985/86. Intense competition from other exporters will cause further shrinkage in the U.S. share of world farm trade, after dropping sharply to $31 billion in 1984/85.

*WILLIAM C. DRENNAN*
*Senior Editor*

Livestock prices are strengthening, as earlier cutbacks in livestock breeding herds, responsible for record meat supplies, are now reducing marketings below 1984 levels. As meat production in 1986 continues below 1985 levels, livestock producers are likely to enjoy higher returns. World meat production could show a slight rise in 1986, as larger pork and poultry production abroad offset lower U.S. red meat levels.

## U.S & Soviet production levels

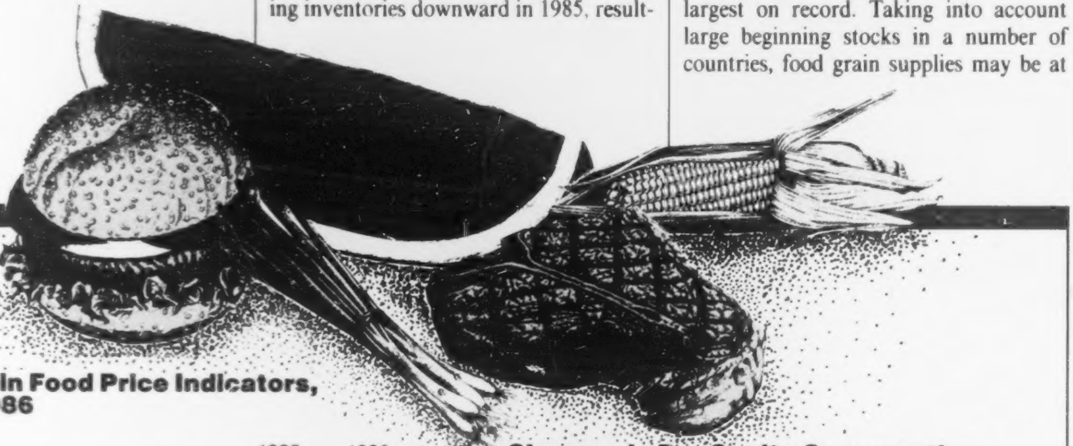
Changing production levels in the United States and the Soviet Union are key factors in the global agricultural outlook for 1985/86. U.S. crop output is expanding more than 6 percent from the 1984 level in response to improved growing conditions and higher yields. The U.S. livestock industry has been adjusting inventories downward in 1985, resulting in high livestock slaughter levels and prices substantially below a year ago. But meat production is easing and should slip below the year-earlier level in the fourth quarter of 1985 and remain at a reduced level until the fourth quarter of 1986.

In the Soviet Union, improved yields are increasing grain production by over one-tenth. This increase, coupled with prospects for larger forage production and reduced livestock inventories, suggests a sharp cutback in Soviet grain imports in 1985/86 to about one-third below the 55 million tons of 1984/85.

According to Ralph Parlett and Karen Bunch of the USDA's Economic Research Service, when data are available for all of 1985, the Consumer Price Index for food is expected to average about 2 percent above last year. This increase will be one of the smallest in 18 years.

Increases in food prices have been moderate to low for the past several years. Large supplies of farm foods at favorable prices have led to increased food consumption in the last three years.

- **Grain:** World food grain production in 1985/86, including wheat and rice is projected at 971 million tons—the second largest on record. Taking into account large beginning stocks in a number of countries, food grain supplies may be at



**Changes in Food Price Indicators, 1985 & 1986**

| | 1985 | 1986<br>Forecast |
|---|---|---|
| **Consumer Prices Indexes:** | | |
| All food | 2.2% | 2-4% |
| Meat, poultry, and fish | – 0.6 | 2-4 |
| Meats | – 1.3 | 3-5 |
| Beef and veal | – 2.2 | 3-5 |
| Pork | – 0.1 | 3-5 |
| Poultry | – 1.2 | – 2-0 |
| Fish and seafood | 4.6 | 2-4 |
| Eggs | – 18.5 | 3-5 |
| Dairy products | 1.9 | – 2-0 |
| Fats and oils | 3.0 | 2-4 |
| Fruits and vegetables | 2.7 | 1-3 |
| Sugar and sweets | 2.7 | 2-4 |
| Cereals and bakery products | 5.5 | 2-4 |
| Nonalcoholic beverages | 2.0 | 2-4 |

**Changes in Per Capita Consumption of Selected Food Groups**

| | 1985 | 1986<br>Forecast |
|---|---|---|
| **Total Food** | 1% | – 1- – 2% |
| Animal Products | 1 | – 2- – 3 |
| Meat | 0 | – 5- – 6 |
| Poultry | 3 | 3-4 |
| Fish | 1 | 1-2 |
| Dairy Products | 1 | 0-1 |
| **Crop Products** | 1 | – 1-0 |
| Fats and Oils | 2 | – 1- – 2 |
| Vegetables | 1 | 1-2 |
| Fruit | 0 | 0-0 |
| Potatoes | 2 | 0-1 |
| Cereals | 2 | 0-1 |

Source: USDA

Source: USDA

**WORLD WHEAT AND FLOUR TRADE**
Measured in Million Tons

| **EXPORTS** | 1983/84 | Prelim. 1984/85 | Proj. 1985/86 |
|---|---|---|---|
| U.S. | 38.9 | 38.1 | 27.2 |
| Canada | 21.8 | 19.4 | 16.5 |
| Argentina | 9.6 | 8.6 | 7.4 |
| Australia | 11.6 | 16.6 | 15.4 |
| EC-10 | 15.4 | 17.5 | 17.5 |
| Sub-Total | 58.4 | 62.7 | 56.8 |
| Other | 5.6 | 8.0 | 6.6 |
| TOTAL | 102.9 | 108.2 | 90.6 |
| **IMPORTS** | | | |
| EC-10 | 3.6 | 2.2 | 2.7 |
| Mid. East & N. Africa | 14.2 | 14.1 | 13.2 |
| Egypt | 6.7 | 6.6 | 6.7 |
| Mexico | .6 | .4 | .3 |
| India | 2.5 | .2 | .1 |
| E. Europe | 3.8 | 2.8 | 4.2 |
| China | 9.6 | 7.4 | 6.5 |
| USSR | 20.5 | 28.1 | 17.0 |
| Other | 41.4 | 46.4 | 39.9 |
| TOTAL | 102.9 | 108.2 | 90.6 |

an all time high. Food grain utilization should slip from last year's record level, despite lower prices. Look for a very competitive grain market in 1985/86.

World wheat import demand in 1985/86, currently projected at around 90 million tons, will be the smallest since 1979/80. Improved domestic harvests will lead to less imported wheat in 1985/86. The most dramatic development is the projected 11 million ton reduction in USSR wheat imports from the record 1984/85 level. World wheat stocks at the end of the 1985/86 marketing year are projected to climb to a record 127 million tons.

Three consecutive bumper world rice harvests have resulted in record supplies of rice on the world market. This, in combination with reduced demand have forced world rice prices to their lowest levels since the mid-60's. However, the U.S. farm loan for rice has prevented U.S. prices from matching world prices. Thus, U.S. rice has become increasingly less competitive on the world market.

Global coarse grain production is expected to reach 844 million tons in 1985/86, 4 percent over last year's record. Global use of coarse grains will reach almost 800 million tons in 1985/86 as it continues to increase. The U.S accounts for about one-fourth of world feed use and the USSR, the EC and Eastern Europe account for half of the remainder.

World coarse grain trade is expected to decline in 1985/86 by more than 8 percent. The major change will be an expected drop in Soviet imports, more than offsetting increases in other countries from last year. U.S. exports could fall below 50 million tons in 1985/86.

- **Red Meats:** Ronald A. Gustafson, Agricultural Economist for the Economic Service and Norval E. Francis, Agricultural Economist for the Foreign Agricultural Service reported on red meats. The outlook for red meats and livestock continues to be shrouded by large total meat supplies, financial problems in the farm sector and an expanding, but sluggish economy.

World meat production is expected to continue its upward movement of past years through 1985. World trade in meat is expected to resume an upward trend in 1985 and 1986. With increasing amounts of meat expected on the world market for the remainder of 1985 and through 1986, prices on all individual products will be pressured downward through 1986.

Emerging farm legislation is an uncertainty clouding the 1986 outlook. This legislation will impact the financial stability through crop loan and support programs which will offset feed grain prices and ultimately feeder livestock prices. In addition, record milk production, with over a million excess dairy cows, along with milk support price reductions could result in dairy herd reductions and increased beef supplies.

Cattle prices should rise somewhat in 1986. Large total meat supplies should somewhat constrain rises in hog prices in the coming year. Strong competition for a smaller supply of slaughter lamb should cause increased prices in 1986.

- **Poultry:** Allen Baker, Agricultural Economist for the Economic Research Service and Jack Ross, Agricultural Economist for the Agricultural Marketing Service reported that broiler and turkey producers are expected to expand output in 1986, but egg production may be off slightly. Prices are expected to remain relatively strong.

With major production efficiency already achieved, the poultry industry is putting more earnings into product marketing. Advertising of brand names has accelerated. The role of brand-marketing is expected to continue to expand. Broiler production is expected to increase by about 4 percent and domestic prices are expected to remain steady.

Turkey production is up in 1985 and output is expected to rise again in 1986. Prices in 1986 may weaken relative to this year. Weak egg prices put egg producers in a cost-price squeeze during much of 1985. With cuts in production expected in 1986, prices may strengthen.

- **Fruit:** Ben Huang, Agricultural Economist for the Economic Research Service, reported that there are challenges facing the future of the fruit industry. Recent freezes in Florida and Texas have destroyed a large amount of citrus acerage and damaged crops. The outbreak of citrus canker in Florida has resulted in a shortage of nursery stock so that the replanting of damaged acerage will be delayed. Competition in the world market for fruit has increased, with oversupplies depressing some fruit prices.

Small supplies and stable demand should keep retail prices for most fresh and processed fruit relatively firm. Per capita fruit consumption has decreased steadily to an estimated 191.9 pounds in 1985, mostly due to higher prices.

- **Vegetables:** Shannon Hamm, Agricultural Economist for the Economic Research Service and Edmund Missiaen, Deputy Director for the Foreign Agricultural Service reported that the 1985 production of commercial vegetables—fresh and processing—is expected to be 2 to 4 percent below 1984.

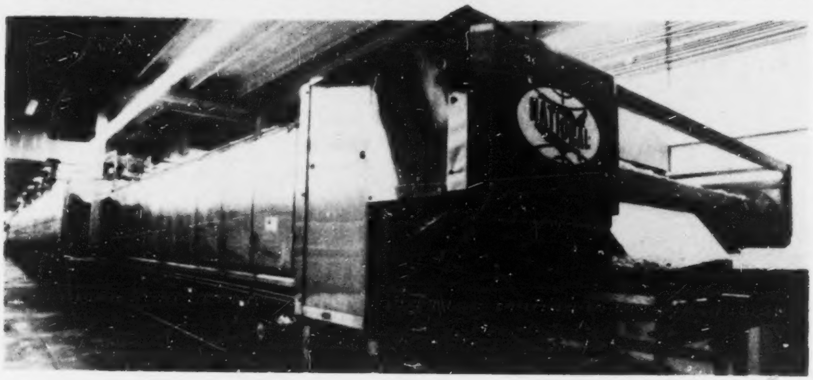
The decline results from a 3 to 5 percent reduction in dual-purpose and fresh-market vegetables and a 2 percent reduction in the four major processing vegetables.

Fresh vegetable imports have grown 7 percent annually since 1980. However, fresh imports still provide only an estimated 10 percent of the total domestic value. Fresh imports do surpass exports in value by about 25 percent. U.S. fresh-market exports have grown at an average annual rate of 2 percent since 1980.

- **Sugar:** John Nuttall, Chief of the Foreign Agricultural Service Sugar

*(Continued on next page)*

NATIONAL FOOD DRYERS & BLANCHERS



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## NEWS/EVENTS

*(Continued from page 15)*

Group and Robert Barry, Section Leader of the Economic Research Service reported that the world sugar market continues to be depressed, despite the fact that world sugar production in 1985/86 should decline by 3 percent. Consumption is expected to increase in 1985/86 to 97.5 million tons, up from 96.8 million tons last year. However, substitution of alternative sweeteners in developed countries continues to erode consumption.

Domestic sugar production and consumption in fiscal 1986 are not expected change much from fiscal 1985, but 1986 prices will be strongly influenced by the domestic oversupply situation.

U.S. consumption of corn sweeteners in 1985 is estimated at 7.7 million tons, up almost a million tons from last year. For the first time, U.S. corn sweeteners will exceed refined sugar consumption.

Consumption of diet drinks has been boosted substantially by soft drink makers' shift to 100 percent aspartame. U.S. consumption of aspartame jumped to about 11 lbs. per capita, at the expense of saccharin. Diet drinks now make up more than 25 percent of soft drink sales.

### Int'l Conference on computers in packaging

The computer is now being harnessed to accelerate the evaluation of new barrier plastic packaging. A computer model has been developed by Campbell Soup Company to predict closure peel characteristics of lidstock for multilayer barrier plastic containers during retorting. There is a high order interaction between internal vacuum levels and sealing time, temperature and pressure during retorting which explains over 90% of the variations in closure peel characteristics.

Another computer model, developed by Monsanto Chemical Company, enables prediction of cost and shelflife (oxygen permeability) performance of multilayer barrier plastic containers, by specifying container shape, volume, surface area, numbers and types of layers and forming process.

These and other presentations will be made at Compupac '86, the First international Conference and Exhibition on Computers in Packaging, to be held in Teaneck, N.J. For further information, contact Schotland Business Research, Inc., Princeton Corporate Center, 3 Independence Way, Princeton, N.J. 08540, (609) 520-0100.

Circle 14 on Inquiry Card

Circle 15 or see FEM, p. 47→

FOOD ENGINEERING'S
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PANEL

**Food Engineering has assembled, from across the broad spectrum of the food and beverage industries, 200 executives who will serve as our Executive Advisory Board during 1986. This group of men and women, representing a wide range of disciplines, industries, and company sizes, will help us probe trends and buying patterns throughout 1986. This first effort looks at the food industry business climate for 1986 and trends in food processing equipment.**

**BUYERS' SURVEY/**YEAR AHEAD

# WE'RE GOING FOR IT IN 1986!

*In effect, that's what the food industry is saying about the year ahead. Food Engineering's Executive Advisory Panel forecasts a strong 1986. Capital spending continues robustly; foreign equipment influence grows.*

Optimistic. If you're the calm, cool, and collected type, that's the word you might choose to describe the mood of the food industry going into 1986. Strip away some inhibitions, however, and you might come up with a more rousing forecast for the year. Something like: "We're going for it!".

That's pretty much the assessment *Food Engineering's* Executive Advisory Panel has made about the coming year. In fact, the closer they are to the situation, their own company or plant for example, the more excited they become. Over half (51.3%) of the survey respondents said they expect business at their company or location to increase by 10% or more this year. They're a little less confident the entire industry can match that record. Only about one in five (19.0%) said the overall food industry's business would grow more than 10%.

The size of your company or location seems to have a special effect on your outlook for 1986. Respondents from locations with less than 100 employees were much more optimistic, with almost two-thirds (64.4%) of them expecting their company's business to increase by 10 percent or more.

Actually it's hard to imagine the food industry growing even close to 10 percent in volume in any year. The industry, overall, would be lucky to achieve a 3%+ unit volume growth rate. But thanks to the American consumers' insatiable appetite for high value-added convenience products, margins in the food business could approach double digits in a number of companies. Another good sign for 1986 is the continued abundance of low-priced food commodities. In fact, in raw material prices, 1986 could be even better than 1985.

## Capital expenditures

The drive for new products, which picked up steam in 1984, should continue into 1986 and, in turn, spur more capital spending. Capital spending has been on the rebound in the food industry and this year poses no threat to that momentum, according to our panel. Panelists were asked to state, within ranges, the total dollar amount their companies were budgeting for production and packaging capital expenditures at their locations and for their company overall.

About a quarter (24.1%) said that the budgets for their locations were less than $100,000. But only about one in nine (11.3%) said total company budgets were within this range. At the other end of the spectrum, about one in seven companies (34.4%) were budgeting over $2,000,000.

The median budgets were $288,193 per location and $750,000 per company.

When we asked panelists to pinpoint certain areas of processing equipment that would be on their shopping list in 1986, no category ran away from the others. Among those scoring high, however, were *instruments and controls* (8.3%), *filling equipment* (7.8%), *conveyors and belting* (7.5%), and *pumps, valves, and fittings* (7.4%). Pumps, valves, and fittings, of course, are the subject of a special survey article in this issue. We're not clear if the interest in this category is running high this year because it is such a staple in any processing operation, or because of recent safety problems thought to have involved valves and similar products.

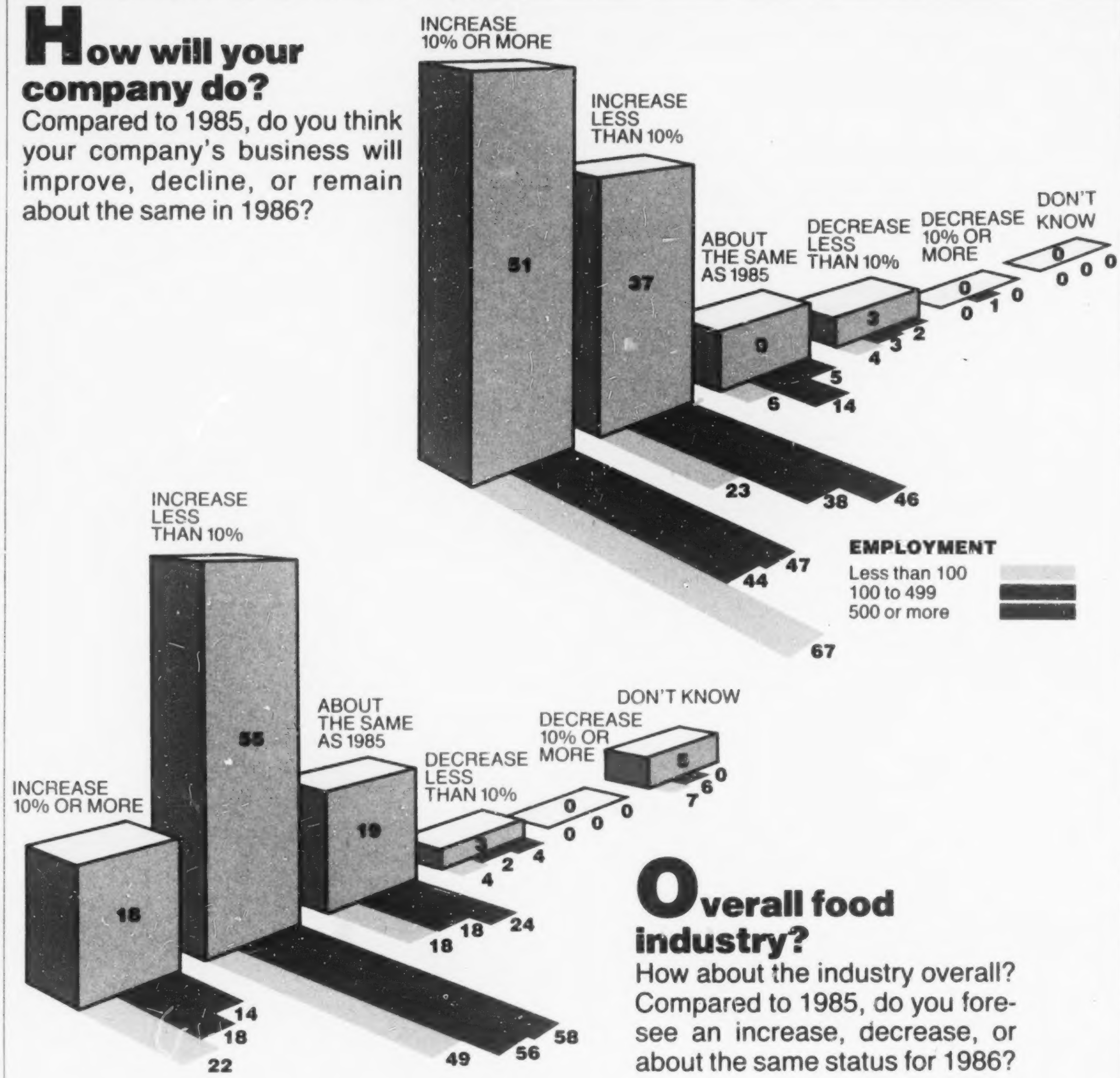
## Eyeing foreign equipment

Until just recently, a strong dollar has encouraged foreign machinery suppliers to put more emphasis on the U.S. market—witness, for example, the increase in foreign exhibitors at American trade shows. With a substantial currency advantage and some well-engineered equipment, a number of European and Japanese builders have found a receptive market in the United States, encumbered with fewer nationalistic prejudices.

Our Executive Advisory Panel, in particular, reflected a positive attitude toward considering

## How will your company do?

Compared to 1985, do you think your company's business will improve, decline, or remain about the same in 1986?



## Overall food industry?

How about the industry overall? Compared to 1985, do you foresee an increase, decrease, or about the same status for 1986?

## Industry-by-industry

The Advisory Panel's responses were also broken down by industry. Here's how the different industries are viewing the year ahead.

**PERCENT OF FOOD PRODUCTS PRODUCED**

| | Meat Products | Bakery Products | Dairy Products | Flavors/ Food Ingreds. | Canned Fruit/Veg /Entrees | Fats and Oils | Frozen Fruit/Veg /Entrees | Confec-tionery Products | Cereals/ Grain Products | Beverages | Other Food Products |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **INCREASE 10% OR MORE** | 12 | 24 | 24 | 30 | 21 | 29 | 16 | 27 | 38 | 14 | 16 |
| **INCREASE LESS THAN 10%** | 61 | 56 | 49 | 43 | 71 | 47 | 68 | 54 | 43 | 63 | 61 |
| **ABOUT THE SAME AS 1985** | 20 | 14 | 16 | 19 | 8 | 12 | 16 | 14 | 14 | 14 | 16 |
| **DECREASE LESS THAN 10%** | 4 | 2 | 2 | 3 | 0 | 12 | 0 | 0 | 5 | 5 | 2 |
| **DECREASE 10% OR MORE** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **DON'T KNOW** | 4 | 4 | 9 | 5 | 0 | 0 | 0 | 5 | 0 | 5 | 5 |

*(Continued on page 68)*

FOOD ENGINEERING'S
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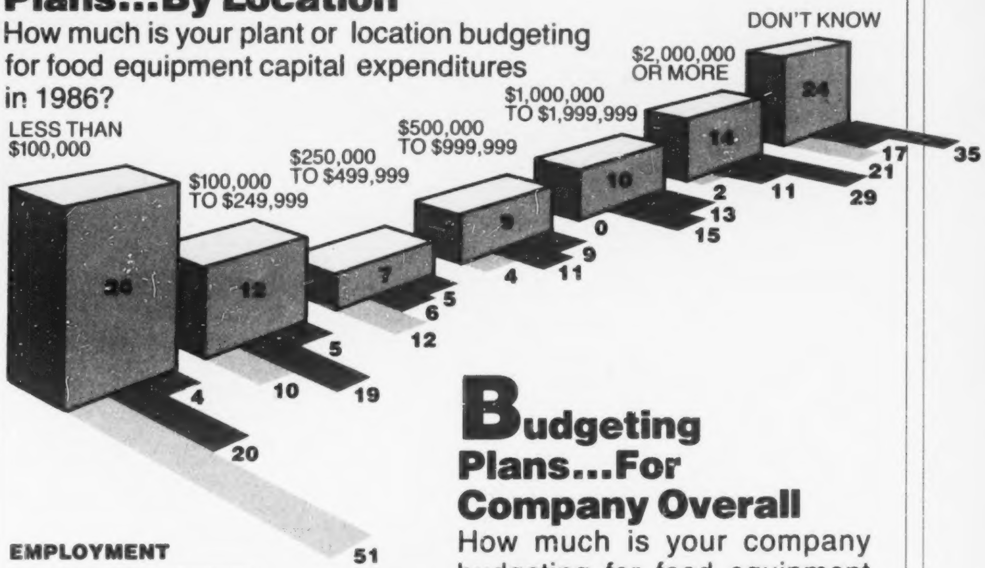
## Budgeting Plans...By Location

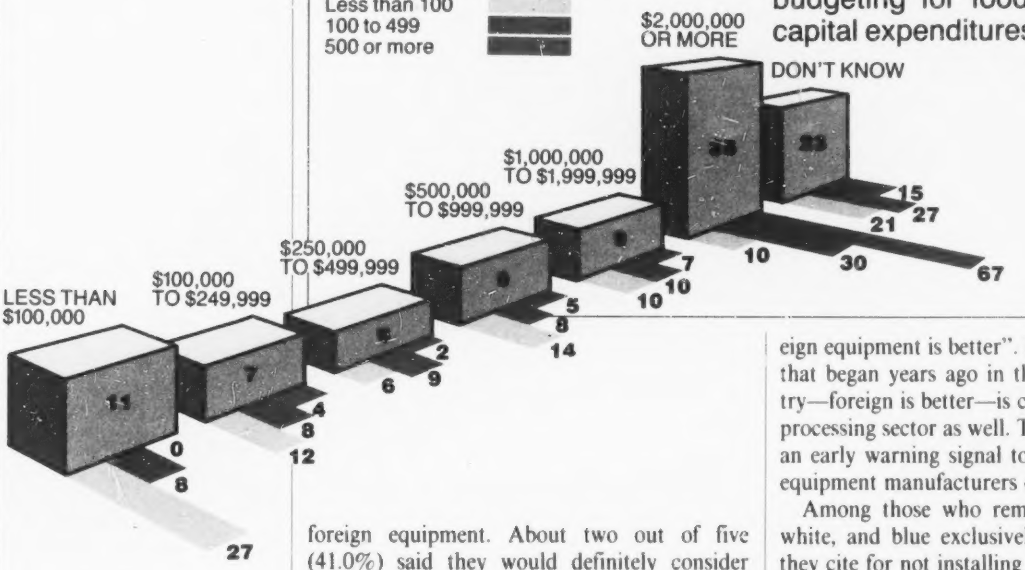
How much is your plant or location budgeting for food equipment capital expenditures in 1986?



**EMPLOYMENT**
Less than 100 ░
100 to 499 ▓
500 or more ▓

## Budgeting Plans...For Company Overall

How much is your company budgeting for food equipment capital expenditures in 1986?



foreign equipment. About two out of five (41.0%) said they would definitely consider purchasing foreign equipment, while another third (34.9%) said they will probably consider foreign equipment. Less than a quarter (22.9%) say they are unlikely to even take a look at the foreign machines.

Again, we found differences in perspective based on company or location size. A majority (52.7%) of the locations with 500 or more employees will definitely consider foreign equipment, while less than a third (30.5%) of the locations with less than 100 employees say the same.

Among those who say they will definitely or will probably consider foreign equipment, the reason mentioned most often is quality, "foreign equipment is better". It seems a perception that began years ago in the automotive industry—foreign is better—is creeping into the food processing sector as well. This should be seen as an early warning signal to the food processing equipment manufacturers of America.

Among those who remain true to the red, white, and blue exclusively, the major reason they cite for not installing foreign equipment is not strictly out of a sense or patriotism but more of a concern about "service and parts availability". Only 14.6 percent listed "prefer to buy American" as their main reason for shopping at home.

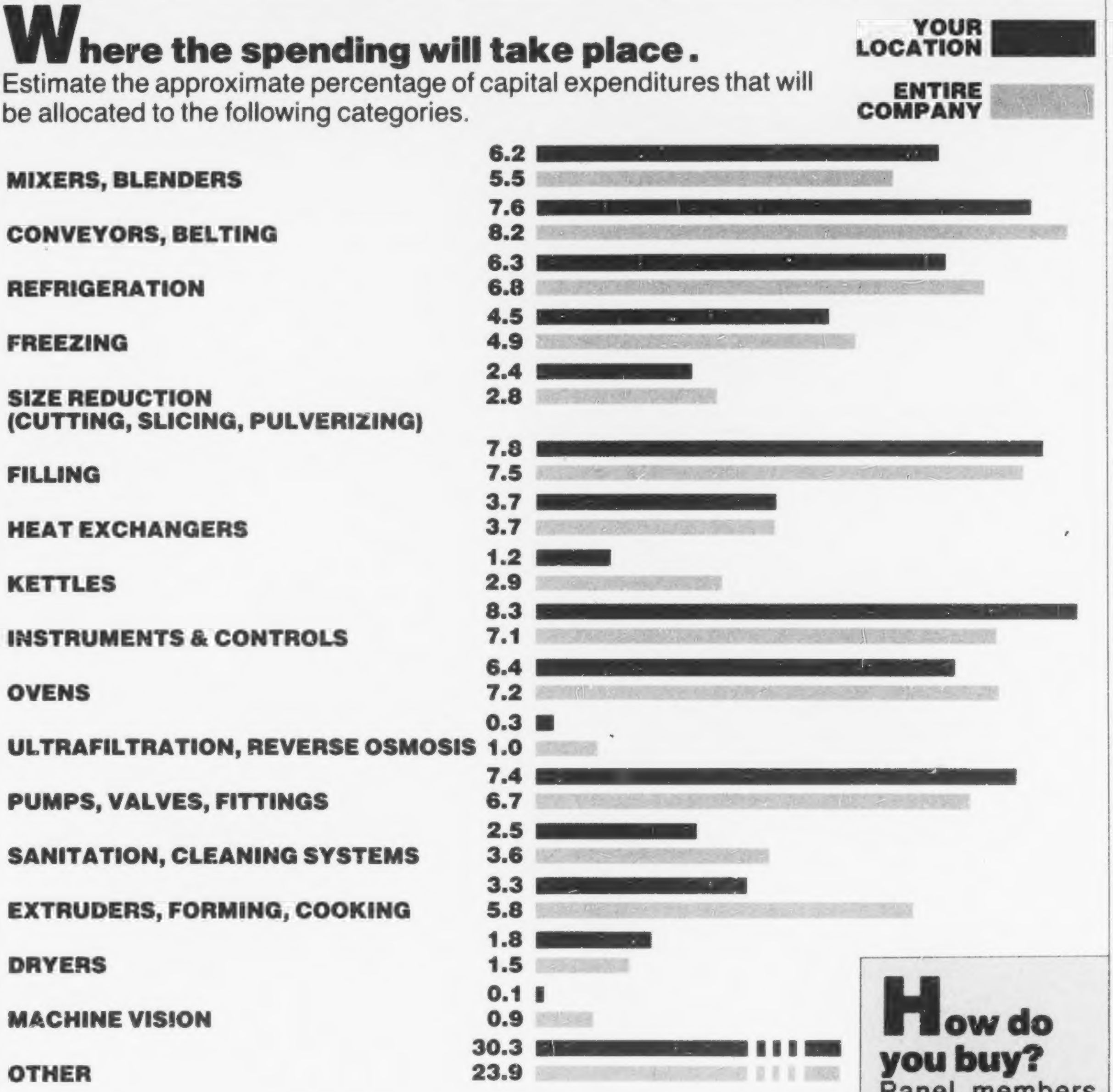
*Food Engineering's* probe of the industry, then, has revealed optimism about the food business for 1986 and a fairly nice shopping list for capital equipment.

### Reasons for optimism

Certainly our panel has every right to be upbeat about the next twelve months in the food and beverage industries. Large supplies of farm commodities, both global and domestic,

## Where the spending will take place.

Estimate the approximate percentage of capital expenditures that will be allocated to the following categories.



dominate the agricultural outlook for 1986. Farm prices and incomes continue to be under pressure and carryover stocks are returning to the high levels of two years ago. A continued slow inflation rate and ample supplies of farm products should continue to limit increases in raw materials costs.

Global supplies of coarse grains and oilseeds will, according to most estimates, be especially ample. The 1985 yields of corn, sorghum, oats, rice and soybeans, boosted by near-perfect growing weather, helped produce the second best total crop production on record. All of this, while not helping the economic plight of our beleaguered farmers, should help the bottom line at many food companies.

Another reason food companies can look forward to 1986 is that the general economic backdrop for 1986 looks good. A number of forecasts seem to be putting GNP growth around 3 percent for 1986, not a spectacular rise but certainly sound and that's all the food industry generally requires to do well. A recent assessment in *Value Line* suggested: "Consumers are willing and able to move to high-margined convenience foods when their incomes are rising, and they also tend to shift from generic and private-label foods to the well-advertised national brands." That's true. And it's easier to persuade people to try new products when their budgets are not under pressure. Those budgets should not be under pressure this year and, again, that bodes well for the industry.

The next twelve months won't be a completely storm-free ride for everyone in the industry.

*(Continued on page 73)*

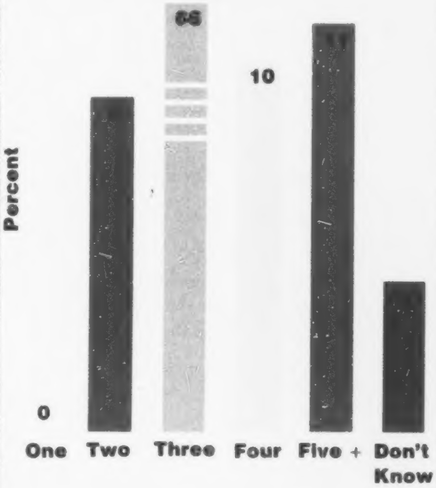
## How do you buy?

Panel members were asked to rank the following in order of their likelihood to affect a decision to buy from a particular manufacturer.

| | |
|---|---|
| **INITIAL PURCHASE PRICE** | **3** |
| **ECONOMY OF OPERATION** | **1** |
| **EXPECTED DURABILITY** | **2** |
| **SPEED OF OPERATION** | **6** |
| **REPUTATION OF MANUFACTURER** | **4** |
| **PERSONAL EXPERIENCE WITH EQUIPMENT** | **5** |

## How many quotes?

How many quotes do you usually get from manufacturers when selecting a major piece of production equipment?



There are some potential problems. But unless the industry shows a propensity for shooting itself in the foot, it should be able to steer clear of of any business storms.

### Battle for market share

Specifically, the industry must be wary that its increasingly heated battle over market shares does not lead to price cutting and, in turn, pressure on margins. While there should be few price wars in 1986, there's always the chance. Desperate conditions can breed desperate actions. In fact, price cutting could be a fall-out of the merger mania and consolidation fever that now grips the food industry. While U.S. demand for food grows only at a 1-2% clip annually, these large corporations find themselves trying to carve up a pie that grows very slowly.

Other pressures on the industry will come from increasingly automated supermarkets. The Universal Product Code is beginning to achieve its potential at about thirty percent of the supermarkets across the country with installations moving at a fast pace. Now able to quickly and efficiently track product movement, supermarkets are taking a more commanding position in dictating what products they will, or will not, stock.

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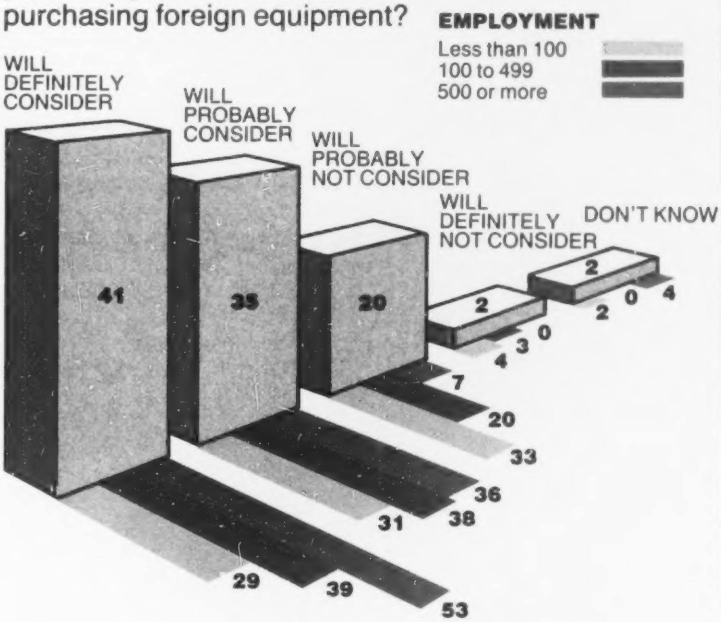
## Attitudes on imports

When purchasing new production equipment, how likely do you think you will be to consider purchasing foreign equipment?



## Why do you say that?

This was asked of respondents who said they will consider foreign equipment.

| | |
|---|---|
| Foreign Equipment Is Better | 32% |
| Past Or Current Experience | 23 |
| Whatever Meets Requirements | 16 |
| Price/Value | 15 |
| All Other | 6 |
| Don't Know | 8 |

## Why do you say that?

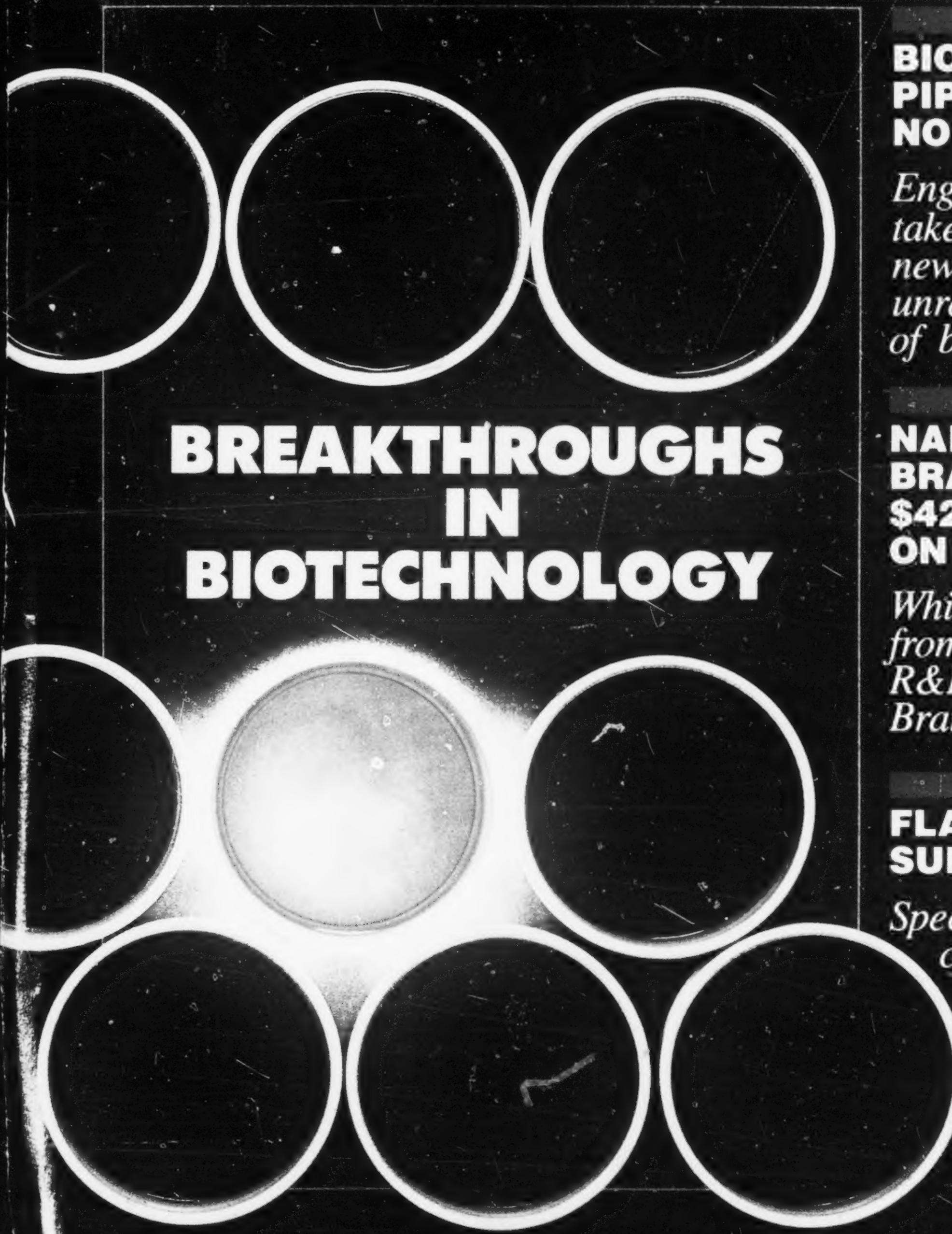
Asked of panel members who said they will not consider foreign equipment.

| | |
|---|---|
| Equipment Available in U.S. | 16% |
| Service/Parts Availability | 33 |
| Prefer to Buy American | 16 |
| All Other | 24 |
| Don't Know/No Answer | 11 |

FEBRUARY 1986

# Chilton's food Engineering

In this issue: **FOOD PACKAGING**



# BREAKTHROUGHS IN BIOTECHNOLOGY

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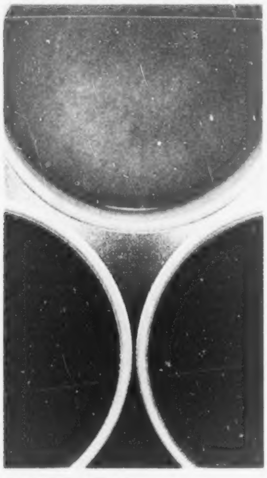
## NABISCO BRANDS BETS $42 MILLION ON R&D

*While others shirk from investing in R&D, Nabisco Brands surges ahead.*

## FLAVORS SURVEY/PART 1

*Special emphasis coverage of the trends and technologies shaping new flavor development.*

# Chilton's Food Engineering



**COVER STORY**

This month's cover story takes an in-depth look at biotechnology, the subject of discussion at a recent symposium at the University of Minnesota. Attendees from 25 nations shared their expertise in the application of biotechnology in the food processing industry.

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**FOOD ENGINEERING®** (ISSN 0193-323X) February 1986, Vol. 58, No. 2. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office

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## News

**12 Food irradiation—limited use?**

Despite the recent FDA ruling approving low-dose fruit and vegetable irradiation, experts agree the technology will never earn a position among the more traditional food preservation methods—such as canning and freezing.

**17 1986—Another frenetic year?**

It appears that the frenzied pace of mergers and acquisitions in 1985 just might repeat itself in 1986. According to top food stock analysts, the basic forces that made 1985 so active, are still in place.

## Departments

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## Features

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In this first part of a two-part series, *FE* examines the changing and challenging role of flavors in today's food industry. What major technological challenges face the flavors industry? How is it responding to those challenges?

**INSTANT, AUTHENTIC, ETHNIC FOOD:** Basic American Foods has introduced refried beans, dehydrated by a new method, to the ethnic foods market. **PAGE 25**

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## Food Packaging

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Swanson Foods, a unit of Campbell Soup Co., made the decision to find an alternative to aluminum trays. But what would replace it? Here's the result of a unique market test to find the right package.

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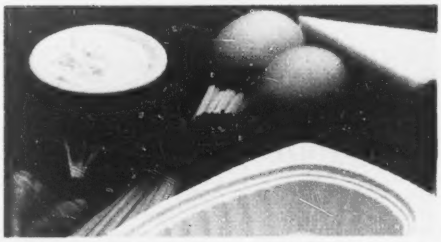
A unique lidding system enables this dual-ovenable, aluminum container to more efficiently prepare different items within the same package.

**49 Ekco's Versatility**

Ekco offers more than its well-known aluminum trays for food packaging. Its line includes a wide range of dual-ovenable options, including CPET, developed from a lengthy background in plastics, including oriented polystyrene containers.



**POLYCARBONATE TRAYS:** General Electric enters the competition in the dual-ovenable tray market with its line of heat-resistant resins. **PAGE 42**

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**HIGH-SPEED CASE ERECTOR:** International Paper's case erector boosted Holly Farms' packaging production by 25% and reduced labor costs 25%. **Page 84**

## *Special Emphasis*

**FLAVORS/**
**PART I:**

This month's Special Emphasis section is the first of a two-part series covering the latest advances in the flavors industry. What challenges are presented to the flavors industry? How are they responding to the challenge? Part II will appear in the April issue. Pages 69 to 74

## Ryder Conference looks at...

# CPET Trays

*Crystallized polyester trays move into the "fast-lane" of the race for the frozen food tray market.*

The rapid success of crystallized polyester (CPET) food trays and other dual-ovenable package ideas owes much to a single idea: That a microwave oven is no longer a luxury but a necessity. By the end of this year, or early into 1987, microwave ovens should reach 50 percent market penetration in the United States.

This is important because the mainstay of frozen food packaging in America has been the aluminum tray. And, despite the efforts of aluminum associations, manufacturers and the like to prove that aluminum can, under most circumstances, be used safely in microwave ovens, it's not a message getting through to most of America. And, despite the fact that aluminum can be coated for a more attractive presentation, some food processors think other materials are more table-presentable.

While the number of aluminum alternatives are many, one of the "hottest" new contenders is a plastic tray manufactured from crystallized polyester. CPET trays are not seen as a replacement for earlier compression molded, thermoset PET trays but they are probably more versatile and less expensive.

An excellent survey of CPET as a dual-ovenable contender was presented recently during one portion of the Future-Pak Conference in Atlanta, GA, sponsored by Len Ryder Associates. This report summarizes some of the CPET presentations at that meeting. The conference also covered topics such as controlled atmosphere, coextruded plastics, and aseptic packaging.

**This photo, supplied by Goodyear, illustrates how broadly CPET packages are penetrating the dual-ovenable container market.**

Barry Cristea of Goodyear, a major PET resin supplier, wasted little time in laying out a bright future for CPET. "Based on recent successes and current market conditions," Cristea said, "Goodyear projects that 100 million CPET trays will be used during 1985. This figure will grow to over 2 billion trays by 1990."

While acknowledging that CPET trays cost more than traditional aluminum trays, Cristea pointed out that with increasing emphasis in the frozen food case on premium priced entrees and other foods, the package does not have to compete with aluminum on price alone. "CPET projects an image of convenience and quality that meets the needs of today's consumer," Cristea suggested. "In addition to these factors, tray design and pigmentation enable the food processor to tailor a package to a specific market."

He has a point. Sales gains in the frozen entree and dinner segments have been strong over the past two years and especially so in the premium gourmet market. Cristea says total sales are up over 30 percent with growth in the premium segment in excess of 50 percent during the period.

While CPET is perhaps the "hot" material in dual-ovenable packaging, it's not without its problems. Before looking at some of these, consider how CPET containers are made.

Manufacture of CPET trays begins at the tray converter's plant with the extrusion of a sheet of amorphous polyester. This sheet is crystallized during the thermoforming operation. Regular PET will heat crystallize in around 20 seconds. Converters have been able to slash that time to 4-8 seconds with the use of nucleating agents and other process aids. Achieving the right degree of crystallinity is critical to making trays with an acceptable low temperature impact strength. Trays with high crystallinity are often brittle.

Another key to CPET container economics is the ability to recover scrap as use it as regrind material. In many cases up to 30 percent regrind may be used to make CPET trays. Experimental work in using up to 40 percent regrind was discussed by Goodyear. The economics of scrap recovery/usage will go a long way toward further improving the economic position of CPET trays in the market.

While CPET trays are acknowledged to cost more than most other alternatives for dual-ovenable packaging, they have other limitations as well.

•*Need for higher heat PETS.* Crystallized PET is stable up to around 425 degrees F which is acceptable to the great majority of applications. But some ovens, especially commercial baking ovens, for instance, have so called 'hot-spots' that could melt even a fully crystallized PET.

•*Colors.* White is nice but there's a growing demand for colors. Achieving a wider range of colors for CPET trays would make the material more competitive with other plastics and plastic/paper combinations.

•*Crystallizing efficiency.* As mentioned earlier, normal crystallization can take as long as 20 seconds but, by the converter adding nucleating agents, that time can be slashed considerably. But how and how much of these external agents are added can vary from converter to converter and thus effect crystallization efficiency and quality.

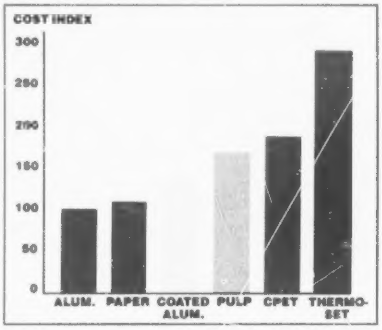
PET resin suppliers say they either have or will soon have answers to these limitations. Joseph Stras of Eastman Chemical noted three new developments.

One new idea Stras points to is a new PET with an approximate 50 degree F higher melting temperature which should bring PET's heat resistance up to around 480 degrees F and meet the challenge of oven "hot-spots".

Variance in crystallization could soon be solved with integrated nucleating agents. Instead of the converter adding them, Eastman would factory-integrate the nucleating agents so critical to crystallization, thus eliminating any guesswork on the part of the converter.

In some cases, adds Stras, it will be possible to purchase PET pellets with both integrated nucleating agents and colors. "We've always had a leadership position in adding colors," continues Stras, "now we're further improving that technology. We realize colors are important in marketing food items because the company's image is carried with the package as well as the food."

**Cost Index Comparison Standard Dinner Tray**



**ABOVE: While CPET may cost more than many other alternatives, higher volumes should bring costs down. Index source: Goodyear.**

**BELOW: Container economics for system producing 36.7 million containers per year. For more details on parameters going into this calculation either refer to the Future-Pak '85 Proceedings or contact A.R. Freedman, John Brown Machinery, Warwick, RI.**

**Container Economics Annualized Costs, $**

| | |
|---|---|
| Material | $ 2,915,650 |
| Material Losses (2.5%) | 72,890 |
| Direct Labor | 522,000 |
| Indirect Labor | 261,000 |
| Utilities | 72,890 |
| Building Rent | 140,000 |
| Depreciation (7 year SL) | 247,150 |
| Working Capital (3 months at 12%) | 120,570 |
| Taxes and Insurance (2% of Capital) | 34,600 |
| TOTAL ANNUAL PRODUCTION COST | $ 4,386,750 |
| **COST PER CONTAINER** | **$0.12** |

**How the ovenable/dual-ovenable market could shake-out by 1988**

| | Billion units |
|---|---|
| Aluminum | 2.0 |
| PET Coated Board | 2.0 |
| CPET | .8 |
| Fiber/PET Film | .8 |
| Thermoset PET | .4 |

Source: Eastman Chemical

## CPET economics

Tray manufacture economics were well presented in a special paper by three spokesmen from John Brown Plastics Machinery. To meet the anticipated U.S. demand for CPET containers, the presenters suggested the most probable production approach would be a dedicated production system. As an example, they laid out the economics of producing 36.7 million containers per year, including a co-extrusion sheet line, thermoform and trim line, reclaim equipment, and material handling equipment. Including labor, utilities, resin, depreciation and other economics the total annual production costs came to just over $4.3 million or $0.12 per container.

## Europe's CPET growth

CPET tray growth has not been limited to the U.S. Dieter Schoenwald of West Germany's ETIMEX said that while microwave oven sales in Europe are far behind the U.S. pace, it is, nonetheless, a significant trend in Europe where the frozen food market is growing at a robust 10 percent a year.

By contrast with the U.S., says Schoenwald, about one million microwave oven units were sold. Microwave oven sales in the U.S. for 1985 will probably hit the 10 million mark. Within Europe, the United Kingdom is the chief consumer of microwave ovens with about 10-12% of households owning one.

Based on Etimex's estimates the European market in 1986 will consume 130 million CPET trays, growing to 300 million by 1988.

A book containing the proceedings of Future-Pak '85 is available from Ryder Associates, Inc., Five Sharon Drive, Whippany, NJ 07981.

Special Emphasis

**FLAVORS/**PART I

# FLAVORS I: THE SEARCH FOR NATURAL SAVORY & DAIRY FLAVORS

*The flavor industry has been busily pursuing the development of new flavors—especially natural—to meet the demands of an increasingly "health conscious, active" population.*

The impact of today's changing lifestyles is immediately apparent on grocery store shelves. Higher quality, premium-priced entrees continue to thrive; foods are being reformulated for microwave preparation; "on-the-go" consumers are eating more snacks; and label claims reflect a growing consumer awareness about nutrition.

While all these changes affect the food industry profoundly, the food industry has, in turn, passed a major portion of these challenges back to flavor suppliers. Flavor suppliers are a unique group. Some companies are huge, providing fragrances and other essences as well as flavors. Many are small, dedicated exclusively to flavors for the food industry. Competition is sometimes fierce in an industry where everyone seems to know everyone else. In many ways, flavor suppliers around the world are not an "industry" as much as a community.

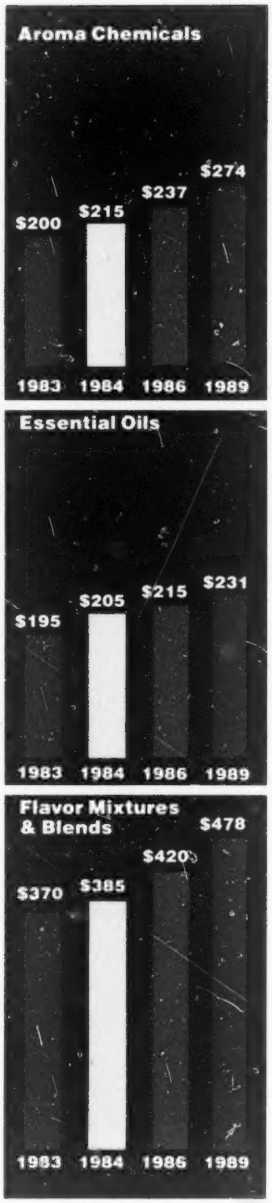
So what is this community identifying as its major technical challenges today and how is it moving to solve them? That's the essence of this two-part report on flavors.

"Naturalness, self awareness and healthy," are the three major driving forces spurring today's new food product activity explains Bill

*ANN E. PRZYBYLA*
*Technical Editor*

*(Continued on page 70)*

**A flavor chemist at H. Kohnstamm identifies key flavor components in order to reproduce them. (Photo courtesy of H. Kohnstamm & Co., Inc.)**



Source: Frost & Sullivan

**Sales of flavors are expected to grow over the next four years according the Frost & Sullivan, Inc. In its report, "U.S. Flavor & Fragrance Market", the New York-based marketing research company provides statistics on this industry.**

Zick, vice president of business development for the flavor division of International Flavors & Fragrances, New York.

"With increasing levels of customer service demands and legislative restrictions, the (flavor) companies are having to increase their capital spending and research and development funding," states analysts at Frost & Sullivan, Inc.—a New York City-based marketing research company.

"The flavor industry is faced with the task to use natural raw materials as much as possible and still hold the line on manufacturing costs. The houses will also have to take a closer look at economic recovery of available natural flavors which may involve new processing techniques to protect delicate, evanescent and heat sensitive components," continues F&S.

Not only are consumers looking for products with natural flavors, they want the products to be of high quality. This, in combination with more convenient foods, which require less cooking time at home during which flavors develop, has led to the development of process or reaction flavors.

## Flavors for processed foods

The use of processed or reaction flavors is becoming more wide-spread. These flavors can be divided into four groups according to the method used in their development. These are: thermal or heat development of flavor; chemical treatment plus the possible use of heat; enzyme treatment of raw material; and fermentation by the use of micro-organisms.

The thermal development of flavors can involve either the Maillard reaction or nucleotide degradation. Oxidation, hydrolysis, sulfonation and the manufacture of hydrolyzed plant proteins (HPP) are examples of chemical treatments used in flavor development. Enzymes are used in the production of both autolyzed yeast extracts and modified cheeses. And, soy sauce is an example of a flavor which is produced by fermentation.

Much of the work of processed flavors is in the area of meat flavors due to their increased usage in high quality entrees, sauces and other savory-flavored foods. These meat flavors are often developed using several of the methods listed above.

Hydrolyzed plant proteins are produced by acid hydrolysis. A grain source such as rice, wheat, soy or corn is added to water in a reaction vessel. The grain is selected based on the desired end product and economics. Acid is then added (its level affects the end product), and the mixture is subjected to elevated pressure and temperature. Approximately 99% of protein is converted to amino acids. This mixture is neutralized and purified resulting in a basic meat-like flavor such as beef or chicken.

A second generation of flavors involves adding other ingredients to the HPP such as dextrose, thiamine or monosodium glutamate and heating under controlled conditions to achieve a more specific flavor. The result could be a roast beef flavor rather than just beef flavor. The third generation would produce an even more specific flavor such as rare roast beef. To achieve this, the amount of specific amino acids in the final product is controlled.

"A smoother, rounder meat flavor than provided by HPPs can be obtained with the use of autolyzed yeast products," explains Marshall Bozzi, Manager of Technical Support for FIDCO, White Plains, N.Y.

In the development of these flavors, enzymes naturally present in the yeast are used to produce an end product with 25 to 30% amino acids, the balance being polypeptides and peptides. (For a more extensive explanation on autolyzed yeast products see *Food Engineering*, Jan. 1986, p.70).

The future challenge in the development of these and other reaction flavors is to identify other components from natural sources that contribute to the desired end flavor.

## New flavors for snacks

Another trait that typifies today's consumer is his or her "on-the-go" life style which, in turn, has produced an "on-the-run" eating pattern. This is reflected in the explosive snack food industry where sales have tripled over the past decade. Especially high increases have been seen in the sales of engineered meats, surimi, breaded chicken bits and flavored extruded snacks.

The growing popularity of surimi-based products in this country has created the need for more seafood flavors. And, with the increasing popularity of these engineered seafoods an growing number of Japanese flavor companies have appeared in this country. A major reason behind this is the Japanese saw the opportunity to share an expertise they have had well in place for many years.

"In Japan, more types of seafood are utilized than in the U.S., and sanitary conditions are in place for utilizing a greater portion of fish as food. In otherwords, the basic ingredients that go into making a good seafood flavor have been utilized as food in Japan long before surimi became popular in the U.S.," points out Edward W. Onyskow, senior food chemist at Takasago Corp., U.S.A., Teterboro, N.J.

Other companies, though, are introducing flavors developed exclusively for surimi products. One example is a new line of shellfish flavors for the surimi market from Givaudan Corporation's Flavor Division. The line is available as both natural and artificial.

Takasago, the largest flavor company in Japan, emphasizes its commitment to doing business in this country by pointing out that it has purchased its manufacturing facilities in the U.S. rather than leasing. In addition, fermented and other types of dairy flavors will be produced in the U.S. for export to Japan because of the better availability of raw products in this country. Among the flavors included in this area are enzyme modified cheeses.

## Enzyme modified cheeses

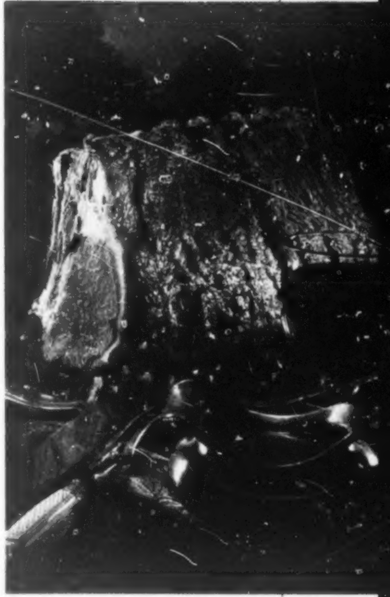
Enzyme modified cheeses are playing an increasingly important role in flavoring snack foods. Enzymes, such as gastric lipase are used to accelerate the cheese aging processing—resulting in more intense flavor of important flavor notes and reduced development time. These cheese flavors can replace as much as 15 times their weight in terms of flavor strength than regular spray dried cheeses, and up to 50% of the dehydrated cheese in a formulation. The reduced amount of solids can be made up with powdered cheese whey, non-fat milk and/or high acid butter milk.

New versions of enzyme modified cheeses are appearing on the market. Beatrice offers a "wet cheese" which achieves intensified flavor by enzymes being released by the starter culture rather than by adding enzyme systems. Its flavor intensity is less than the traditional enzyme modified cheeses (or about three time that of sharper cheddar), but the product can be labeled as "cheddar cheese" rather than "natural flavors" or "enzyme-modified cheese."

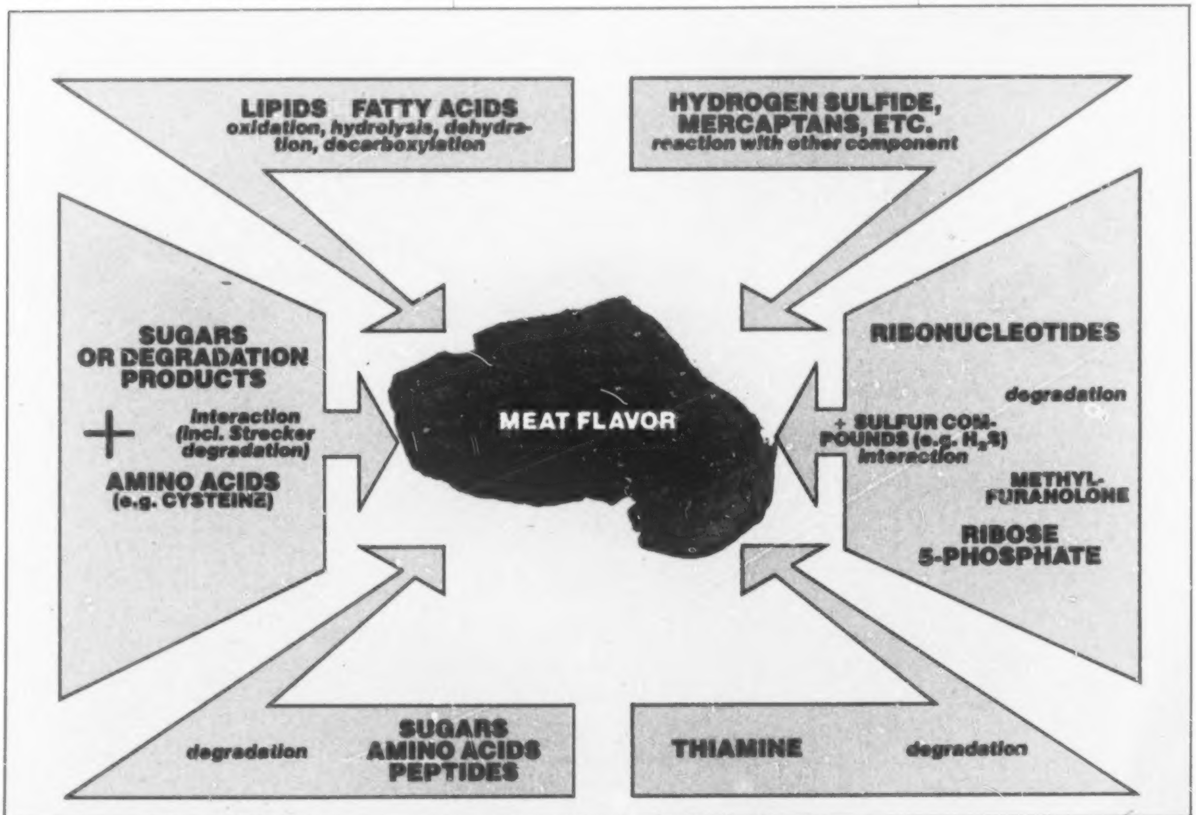
Biotechnology also has played a part in the development of enzymes to accelerate flavor development during the aging process of cheese. Chr. Hansen's Laboratory, Inc., Milwaukee, Wisc., recently announced the commercial availability of *Flavor Age—FR*—a blend of lipase and protease enzymes which works in harmony with other naturally present enzymes. These microbially derived enzymes are a result of a joint agreement between Hanson's and Genencor, South San Francisco.

The lipase enzyme in this flavor development system breaks down milk butterfat to form a free fatty acid flavor profile similar to that of typical cheddar and cheddar-type cheeses. The manufacturer points out that the lipase in Flavor Age-FR is different from other commercially available lipases because it is water dispersible rather than water soluble. This allows the lipase to be more effectively entrapped in the

*(Continued on page 72)*



**The development of meat flavors are becoming more sophisticated. Above photo courtesy of FIDCO Ingredients Development Co. Chart below courtesy of Dr. Charles Manley, National Starch & Chemical Corp.**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METHYL-FURANOLONE
RIBOSE 5-PHOSPHATE
degradation
SUGARS AMINO ACIDS PEPTIDES
THIAMINE
degradation

**A lab technician completes a pH test on a blended cheese flavoring. Photo courtesy of FIDCO Ingredients Development Co.**

cheese matrix.

The protease enzyme accelerates the process by attacking the milk casein and breaking it down into peptides. These react with naturally occurring milk proteases and starter culture proteases to boost body breakdown.

## Carrier systems for flavors

Flavors for extruded snack foods can be added to the system before extrusion or topically. Topical addition of flavor gives impact flavor while internal flavors provide a continuance of flavor. In using grains with more inherent flavor such as corn, topical addition of flavors is usually sufficient, points out Bill Zick of IFF.

Spray dried flavors are often used for topical application to snack foods. Spray drying involves a continuous process of transforming a liquid feed into a dry, free-flowing powder. This is accomplished by spraying the feed into a hot drying chamber where water is removed and the dry product collected. Flavors are often spray dried with edible gums, starches and dextrins as encapsulating agents. These ingredients can protect the flavor constituents from volatile loss and/or oxidation.

Gum arabic is often included in the carrier matrix because of its excellent emulsifaction and film forming properties. Further, it contains minute amounts of natural antioxidants which help protect the flavor, points out John Scire, director of flavor development and flavor research for Fritzsche-Dodge & Olcott, New York. In the production of spray dried flavors, product quality is affected by inlet and outlet temperatures of the spray dryer, in-feed solid content, particle size distribution and volatility/solubility of the flavor constituents.

An example of the ingredients used in one type of encapsulated flavors from Durkee are: maltodextrin, gum arabic, flavor, emulsifier and silicondioxide. The company uses a process of extrusion encapsulation to increase stability of flavor chemicals solubilized in oil, alcohol, propylene glycol or water.

A number of extrusion stable flavors, which are combined with the cereal matrix prior to extrusion, are available. Since extrusion involves subjecting the raw material to high temperatures and pressure prior it being forced through an extruder-die, the flavoring material must be able to withstand extreme conditions. The high pressure and temperature prior to extruding results in the cereal matrix expanding after passing through the die.

Naarden International has done work with pre-extrusion flavored filled snacks—where the extrusion and filling of a snack occurs simultaneously. The company has developed a cream

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filling which is stable during the extrusion process and storage. In addition, this cream filling has a low melting point and fat content.

Applying a fat coating to the outer side of the tube covering to prevent moisture absorption from the environment is recommended. The outer tube can be either flavored prior to extrusion with pre-extrusion flavors, or flavors can be "dusted on" directly after the fat coating is applied.

Another area where flavors have application in snack foods is their use in oils for frying. Beef tallow is used in some food service establishments for deep frying snack foods and other items. With required ingredient labeling of foods served away-from-home being discuss, interest has been generated in using vegetable oil for frying instead of the beef tallow. By flavoring the vegetable oil, the flavor contributed by the beef tallow could be maintained.

Another problem encountered when serving deep fried foods is maintaining consistent flavor. As new oil is added to a system to replace the oil absorbed by the food being fried, the oil's flavors changes. Filtering the oil also effects its flavor. IFF is currently looking at flavors for oils. Developing stability of these flavors—which would be subjected to the high temperature of frying—is a major obstacle.

### Demand for natural remains

Developing consistent sources for natural raw materials and discovering natural processes for providing flavors is the direction of much of today's flavor research. And, it doesn't appear that this direction will change in the near future. Both microbiologist and enzymologist will be playing an increasingly important role in this area, since both of these areas fall within the government's definition of natural processes. Other methods considered as natural processes include fermentation, extraction and separation techniques, genetic changes (which will require FDA approval), and heating within certain limits.

"Natural is a legal, not a scientific definition," explains Michael Brooks, Chief Flavor Chemist at H. Kohnstamm.

Yet, while discussions concerning the definitions of natural flavor continue so does the research into securing new, consistent sources of raw flavoring materials and the search for economically feasible methods the develop natural flavors within current requirements.

*Flavors II, which will appear in April, will look at vanilla and fruit flavors and their role in flavoring products such as beverages (still and dry mix), dry mix desserts and other products.*

(Continued on page 74)

> *"Naturalness, self-awareness and health are the three major driving forces spurring today's new food product activity,"* . . . Bill Zick, vice president of business development for the flavor division of International Flavors & Fragrances.

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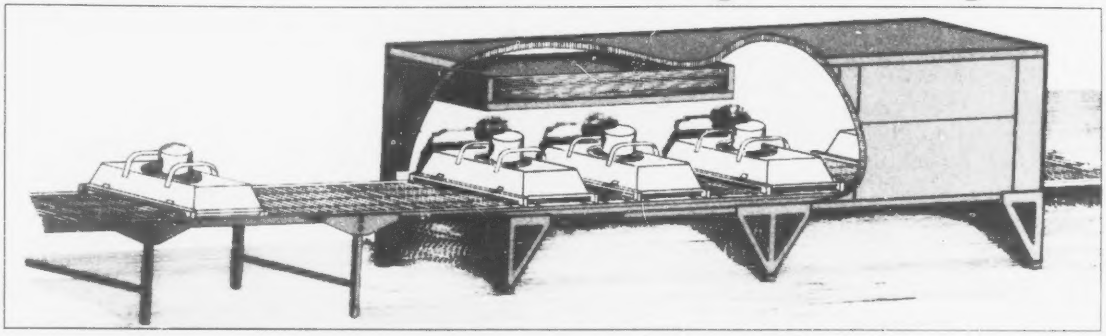

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The INATEC Congress will take place in the adjoining Congress Center East. It is aimed at food manufacturers, technicians and scientists from the area of food technology and process technology and at manufacturers of machines and equipment for the food industry.

INATEC Cologne 1986 has received Certification by the U.S. Department of Commerce, making it the most significant international event in 1986 for export sales of the American Food Processing Machinery and Supplies Industry.

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# Finding sources for natural flavors poses problems

In the U.S. only flavors isolated from a natural material by physical methods can be labeled as natural. Until recently, it has not been possible to determine the source and method used to produce a flavor. With numerous imported food products in this country and the differing definitions, this has caused some concern—especially since many nature-identical flavors are less expensive to produce than their natural counterpart.

Isotopic methods are now being refined which can be used to establish a flavor origin and the method used to produce it. The method involves measuring the amount of $C_{13}$ and $C_{14}$ in the flavor. Since many natural flavors have plant sources while their nature-identical counterparts often use petroleum or coal tar as a starting point, this method has proven effective. Much methodology has yet to be worked out.

The Flavor and Extract Manufacturers' Association (FEMA), which is engaged principally in activities which assure its members of a substantial supply of safe flavor materials, is funding research to develop this methodology further. It recently reached an agreement with the Center for Applied Isotopic Studies (CAIS), University of Georgia, for a five-year joint study with FEMA on the application of isotopic ratios and other analytical procedures to detect adulteration in flavoring materials.

Natural benzaldehyde (or pure bitter almond) is one of the primary flavors that FEMA is interested in monitoring. Natural benzaldehyde was produced from apricot and peach pits at one time. Glucoside from the pits was converted to benzaldehyde and glucose, with hydrogen cyanide prussic acid as a by-product. But now peach and apricot pits are used to product laetrile—a more lucrative product.

France offered a product labeled oil of benzaldehyde, but in late 1984 CAIS discovered, through isotopic methods, that the benzaldehyde was made from toluene at a fraction of the price of producing natural benzaldehyde. High fractionation columns were used to remove the impurities.

Fries & Fries and others have introduced a natural benzaldehyde recently, but the price is considerably higher than any other source of benzaldehyde available. Currently, this leaves users of benzaldehyde three choices: 1) Label their product as natural and artificially flavored; 2) Pay much more for the natural flavor; or 3) Revise their formula.

Several years ago the Bureau of Alcohol, Tobacco & Firearms withdrew a proposal for ingredient labeling of alcoholic beverages and decided to determine case by case which ingredients, due to health risks, should be labeled. Presently, only FD&C Yellow Dye No. 5 must be labeled. Proposals to label sulfites over 10 ppm and saccharine are pending.

The source of benzaldehyde is not a question of safety but of economics. And, labeling the source of benzaldehyde doesn't become an issue unless the manufacturer wants to declare its product as all natural on the label. Then to get label approval from the Bureau all ingredients must be certified as natural.

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MARCH 1986

# Chilton's Food Engineering

In this issue: **ENGINEERED FOODS** $3

## NEW PLANT OF THE YEAR

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## CHEDDAR MASTERS

*At the world's largest cheese plant, milk-soli manufacturing uses international expertise combined with maximum micro technolog*

## SITE SELECTION

*How to do it and make it work.*

## THE BIG CHILL

*In cooling and refrigeration the trend is toward providing food manufacturers with more automation, mor computer-based control, and faster produc tion speeds. The goal is to increase cooling and refrigeration efficiency, while reducing energy costs and improving reliability.*

# Chilton's Food Engineering

**ABOUT THE COVER**

Each year *Food Engineering* selects a "New Plant of the Year." Golden Cheese Company of California, the world's largest cheese plant, was this year's choice.

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**FOOD ENGINEERING** (ISSN 0193-323X) March 1986, Vol. 58, No. 3. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office © Chilton Company, 1985. All rights reserved.

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**27 Merger/acquisition effects**
There is growing evidence that mergers do not provide a panacea for ailing companies. To the contrary, mergers often can cause the decline of relatively healthy companies.

**33 The strike at Hormel**
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**TRUFFLES FIND SWEET U.S. MARKET:** Upscale, fine chocolates are capturing an ever-increasing segment of the U.S. confectionery market. **PAGE 39**

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**80 New Plant of the Year**
*Food Engineering* visited the Golden Cheese Company of California's new $110-million plant, the result of an international venture combining British, Irish and Danish technology with American ownership and marketing. The high degree of technology at the plant allows high production levels with a workforce one-third the size normally needed for a plant of this scope.

**93 Site Selection**
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**101 Refrigeration & Freezing**
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**SITE SELECTION:** The factors facing corporate real estate executives in choosing a new plant site are many and their decisions have long-term ramifications. **PAGE 93**

## Engineered Foods

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A new bread base offers the nutritional profile of a breakfast cereal—good news for those of us who sometimes skip breakfast.

**64 Cheese Substitute**
This lower-calorie, cholesterol-free, low-in-saturated-fats substitute for natural cheese is now available in retail markets.

**67 Surimi**
Research has shown that surimi and the glandless cottonseed are two of the world's best sources of protein. Those two ingredients are being used in a high-protein drink that serves as a meal replacement.

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With more stringent regulations being considered by the FDA in the use of sulfites, alternatives are being developed for use with fruits and vegetables.

**70 Analog Parmesan**
There is no cholesterol, lactose or whey with this analog, but the result is a product that tastes like real cheese.

**75 Soy Sauces**
The need for specialty soy sauces has led to the development of new varieties: low-calorie, light color, preservative-free and dehydrated are just some of the new forms of an old favorite.

**BREAKFAST-IN-BREAD:** This bread base, with the nutritional profile of breakfast cereal, provides a breakfast alternative for traditional breakfast-skippers. **PAGE 61**

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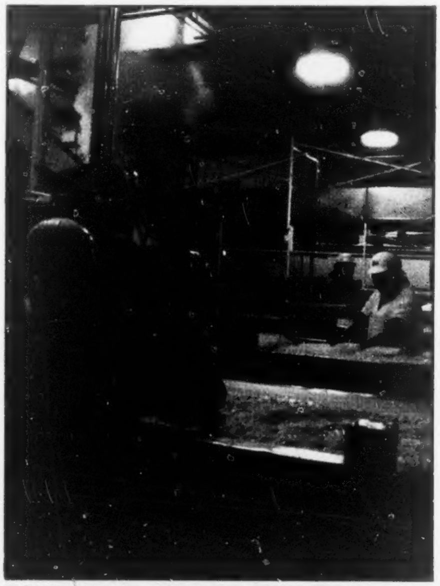
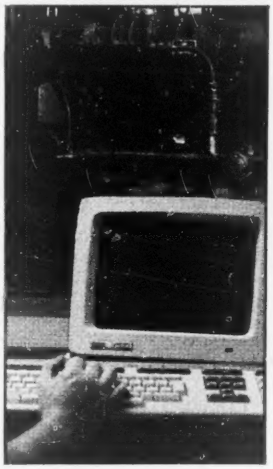


**EQUIPMENT SPELLS SUCCESS:** Smith Frozen Foods found that new equipment, allowed them to expand successfully, and profitably. **Page 117**

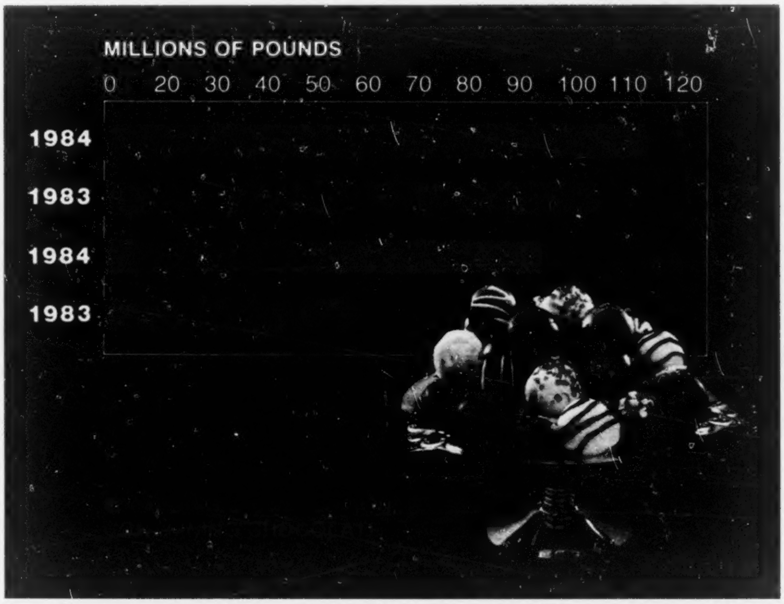


## *Special Emphasis*

**REFRIGERATION & FREEZING:**
March's special emphasis section highlights the very latest in refrigeration and freezing, both the technology and the equipment. **Pages 101 to 108**

## MARKETPLACE

# U.S. market for Truffles and other "fine" chocolates shows rapid growth



**Americans are consuming more chocolates. U.S. chocolate manufacturer figures from U.S. Dept. of Commerance, imported figures from National Confectioner's Association, and photo courtsey of Birnn Chocolates.**

Americans are increasingly satisfying their sweet tooth with upscale, "fine" chocolates. Imported (often associated with quality chocolates) chocolate-containing confections are making huge gains in sales volume in this country. Between 1983 and 1984, poundage of imported chocolate confections sold in this country more than doubled (see chart). And, the U.S. manufacture of chocolate in presentation boxes (a smaller category) also showed a healthy gain.

Truffles, a popular upscale candy with origins in France, are now being produced by a host of U.S. manufacturers. Yet, if one asked a dozen manufacturers of Truffles for a definition, one is likely to obtain a varieties of answers.

### Named after a mushroom

The original truffle is a rare, mushroom-type product that grows on the roots of oak trees found only in the Pyrenees Mountains of France. They are located by allowing wild hogs to sniff them out. These French truffles are round and have hard, dark exteriors. Reportedly, a French candy maker—upon developing a candy with a hard, dark chocolate exterior and a soft, creamy inside—called it a truffle because it resembled the mushroom-like truffle in appearance.

Lines of chocolate truffles have been introduced by large and small manufacturers alike. A regional company to begin producing truffles last November is Birnn Chocolates of Highland Park, New Jersey. Sold mostly through gourmet food stores in the East, these candies retail anywhere from $15 to $25 a pound. The following varieties are available: Amaretto Milk; Champagne Dark; Champagne Milk; Chocolate Dark; Chocolate Milk; Coffee Milk; Grand Marnier Dark; Mint Dark; Raspberry Dark; and Rum Milk.

Chitchley's *Continental Truffles*—also manufactured in New Jersey—were introduced last October. The line which sells for approximately $10 a pound retail, is available in Coffee, Orange, Chocolate Mousse, and Soft Caramel in Milk Chocolate. Each variety has a different shape. These include a shell-like exterior or one with a rose design on top.

A West Coast candy maker to introduce a line of Truffles is See's Candies, headquartered in South San Francisco. See's line consists of Mint Chocolate, Dark Chocolate Chip, Orange Chocolate, Cafe au Lait, Raspberry Chocolate, Light Chocolate, and Dark Chocolate. These Truffles have shapes varying from round and flat to square.

Godiva Chocolatier, Inc. first introduced its line of *La Grande Truffles* in early 1984. This month the original line of Chocolate, Chocolate au Lait, Cerise, and Vanille was expanded with the addition of La Grande Truffle a la Menthe. Godiva also has a seven item line of Petite Truffles which were introduced in the fall of 1986.

A European line of Truffles produced by Lindt in Switzerland, is imported by several U.S. companies. Al Hobby of Telemar—one of the importers of Lindt's round chocolate Truffles—points out that a white chocolate with a creamy white chocolate filling has recently been added to the line.

"Truffles" have gained such appeal with consumers that they is even being used to name varieties of candy bars. Nestle recently launched a line of four premium quality chocolate bars in the United Kingdom. One of the varieties is "Chocolate Truffle."

### Other quality imports

Truffles are not the only upscale chocolates being imported from Europe. Biscuit & Confections, Inc. of Bronx, New York, recently began importing Milk Chocolate Cordial Cherries and "Friedel Confiserie." The Cordial Cherries are produced in West Germany by Carl Brandt. These candies have a cherry center which is surrounded by thin, sweet liquid, and covered with a rich chocolate. The ingredient listing for these chocolates is: Sugar, cocoa mass, cherries, milk powder, corn syrup, cocoa butter, sorbitol, citric acid, lecithin, vanillin, artificial, and natural flavors.

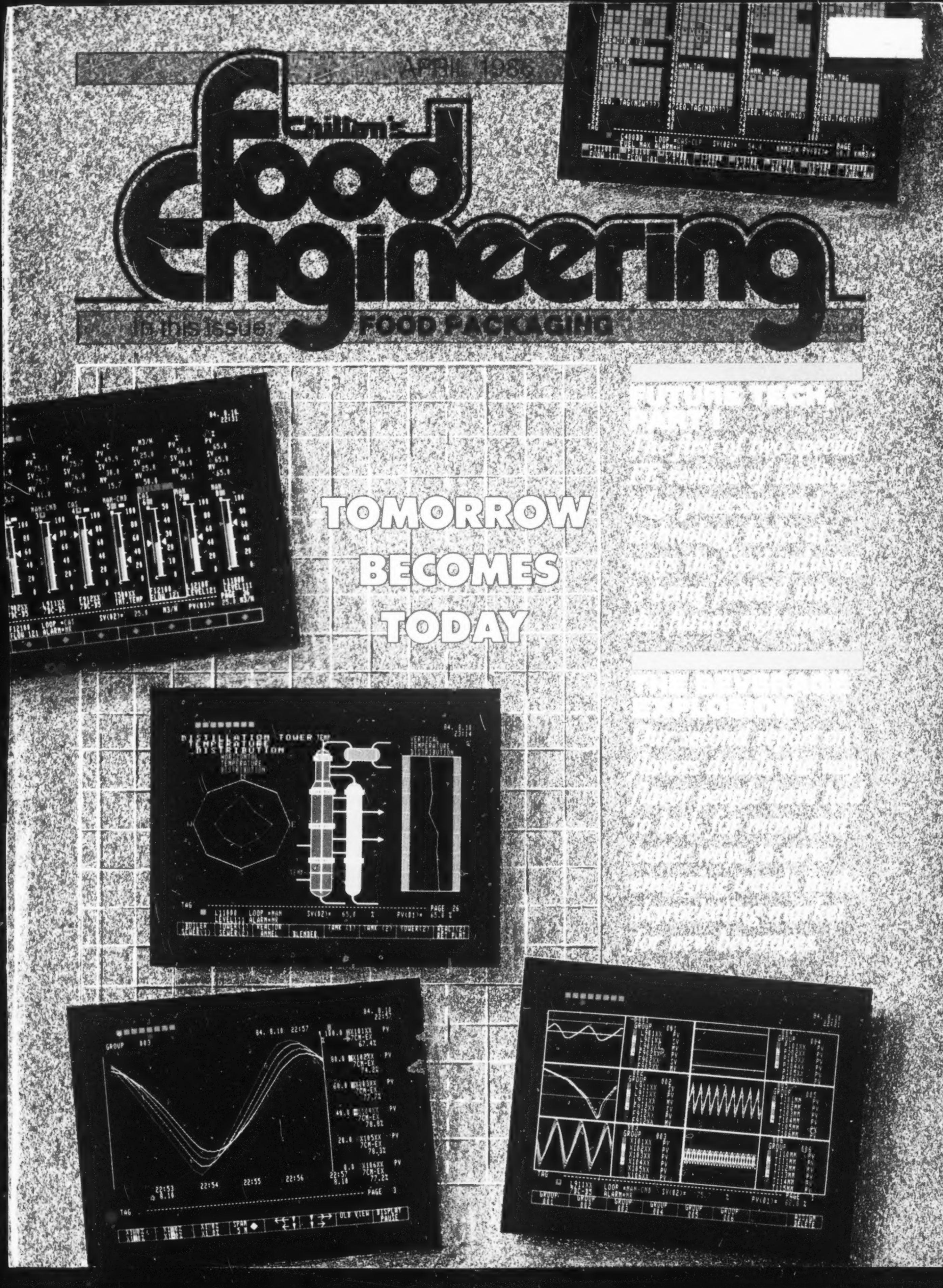
Also imported by Biscuit & Confections, *Friedel Confiserie* is a small (1-1/2 ounce net weight) box of filled chocolates. Each gold box comes with a small bouquet of cloth, red roses and a note that says, "I love you." The varieties in the box include Hazelnut Praline and Coffee-Dessert. They are made in West Germany by Robert Friedel.

Also new from Europe are Droste Chocolate Sticks, available in butterscotch, mint, and orange varieties. Each retail box contains 40 sticks. The orange contains real orange peel covered with milk and dark chocolate.

APRIL 1986

# Chilton's Food Engineering

In this issue: FOOD PACKAGING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OLD VIEW
DISPLAY PAUSE

## TOMORROW BECOMES TODAY

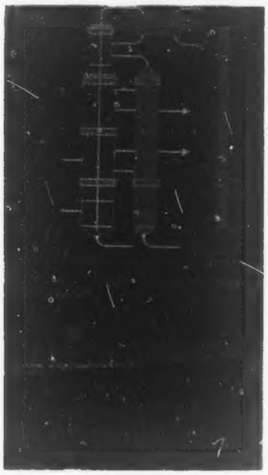
## FUTURE TECH, PART I

*The first of the special FE reviews of leading-edge processes and technology looks at ways the food industry is being pushed into the future right now.*

## THE BEVERAGE EXPLOSION

*Our second report on flavors details the way flavor people have had to look for more and better ways to serve emerging trends in the skyrocketing market for new beverages.*

# Chilton's Food Engineering



**COVER STORY**

Future Tech, Part I takes a look at some innovative technologies and systems to offer new approaches to solve old problems—and the problems of tomorrow. Part II will appear next month. (Color graphics on the cover are courtesy of Yokogawa Corp. of America)

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**FOOD ENGINEERING**® (ISSN 0193-323X) April 1986, Vol. 58, No. 4. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office

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## News

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In an exclusive interview, long-time President and CEO of the National Food Processors Association Charles Carey reveals his industry concerns and talks about the status of the association's ongoing projects. Carey also crystallizes the objectives of this predominant food industry association.

**19 Coming: a foreign invasion?**

The American food industry is ripe for an invasion from Europe and Japan, says Dr. Lester Carl Thurow, professor of economics at MIT's Sloan School of Business Administration.

**21 Gerber: no recall**

Gerber Products Co. is taking a firm stand in the current tampering crisis. None of its baby food products will be recalled, despite reports of tampering in 35 states.

CLASSIC LITE
CLASSIC LITE
CLASSIC LITE
NEW
NEW
NEW
NEW

**LOW CALORIE FROZEN ENTREES:** The market for premium quality, low calorie frozen entrees continues to grow. Armour has expanded its *Classic Lite* line to satisfy American appetites. **PAGE 23**

## Features

**45 Future Tech**

Faced with the constantly-changing environment in which the food processing industry operates, management faces the continual struggle to adapt and innovate. *Food Engineering* takes a look at some new technologies available to the industry, and some new ways to use old technologies. Part I of a two-part series appears this month, featuring Robotics in the Lab, Computer Integrated Manufacturing, Supercritical Extraction, Flow Injection Analysis, Microwave Processing, Machine Vision, Irradiation, and the Waterknife.

**61 Flavors/Part II**

Skyrocketing interest in beverages containing fruit juice has caused a flurry of activity in flavor research laboratories. With the popularity of blended fruit juices, wine coolers and soft-drinks containing fruit juices continuing to grow, *Food Engineering* takes you inside the labs to see what is happening now, and what is ahead, in flavors research. The second part of a two-part series, Part I appeared in February.

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## Food Packaging

**28 FOODPLAS**
In his remarks at the conclusion of the recent FOODPLAS conference, Dr. Melvin Druin of Campbell Soup Co. was optimistic about the opportunities for increased use of plastics in packaging. At the same time, however, he recognizes the challenges this use will present.

**30 Spaghetti Jars**
Continental Can has manufactured PET containers capable of handling most hot-fill applications. It's a new use of an already-known technology.

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RJRArcher has been able to meet a difficult lidding challenge: make a lid that will give a tight, safe hermetic seal yet still be easy to open for the consumer.

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The Wornick Co. has developed a process to produce shelf stable foods in barrier plastic trays.

**38 Table Mold**
Ocean Spray's new decorative table mold gives a traditional product, cranberry sauce, a new look, with the added plus of shelf stability.

**40 Barrier Plastic**
As more and more packaging shifts from glass to plastic, *FE* talks to Continental Plastic to find out what is involved in the transition—what to consider, how to handle redesign, how to convert existing bottling lines, etc.

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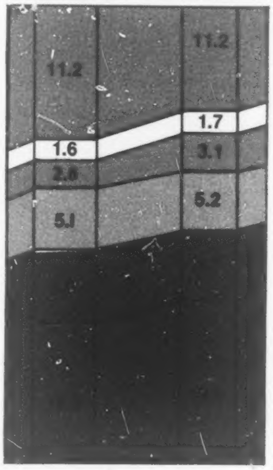
**MICROWAVE CUISINE:** The Wornick Co. used its expertise in retort pouches to develop a new process to produce shelf stable foods in barrier plastic trays. **PAGE 37**

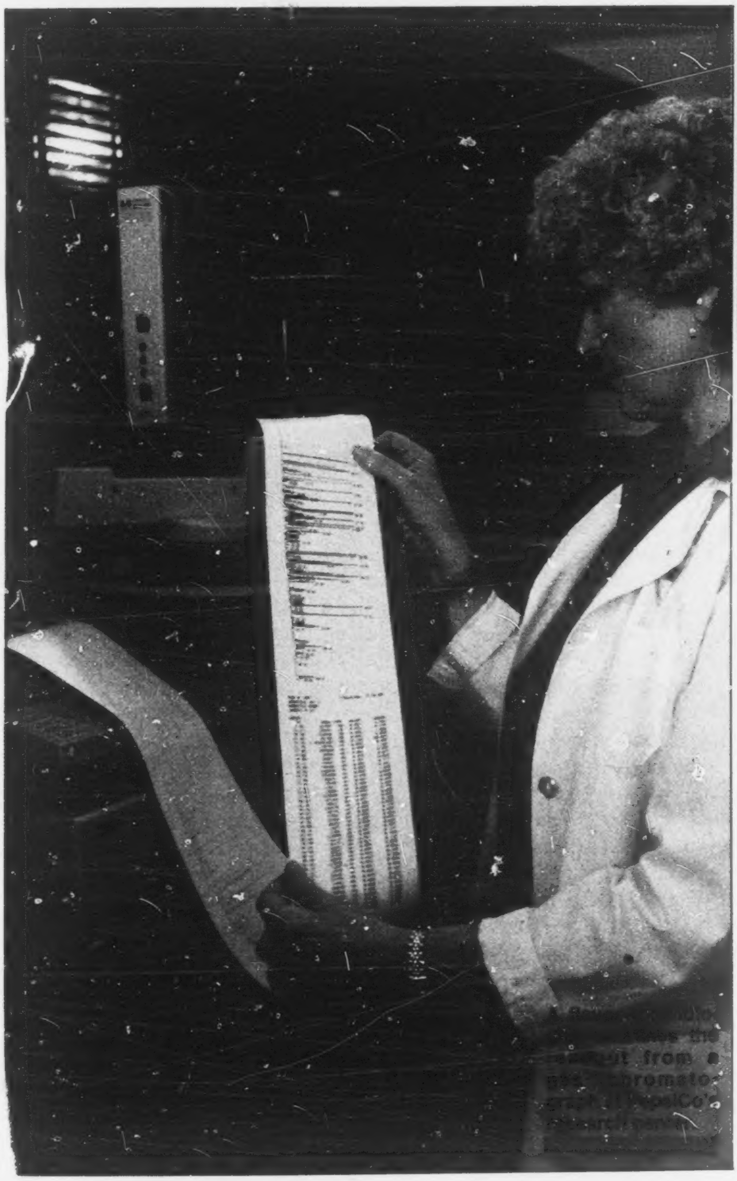


*Special Emphasis*

**FLAVORS/**
**PART II:**

In the second part of this two-part series, we look at the changes and innovations in flavors research brought about by the overwhelming demand for blended fruit juices, wine coolers and soft drinks containing fruit juice. **Pages 61 to 71**

# FLAVORS II: NEW FRUIT FLAVORED BEVERAGES CREATING SPLASH



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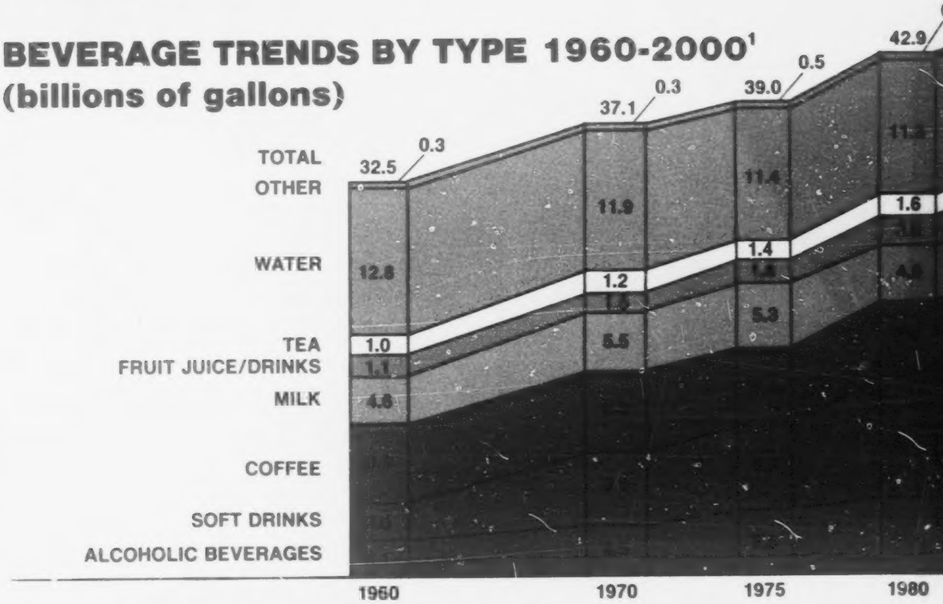
*As the popularity of blended fruit juices, wine coolers, and soft drinks containing fruit juice continue to skyrocket, so has the demand for fruit flavors. In Flavors II, Food Engineering examines how this increased demand for fruit flavor is affecting flavor research by visiting a number of flavor research laboratories.*

Fruit flavors are in! That's what Coca-Cola discovered when it introduced *Cherry Coke* last year. Exceeding even Coca-Cola's expectations, Cherry Coke has captured 3-4% of the market and has opened the way for new varieties such as Vanilla Coke, Lemon Coke, or even a Chocolate Coke. All are currently under development.

Research at PepsiCo, Inc. into new fruit-flavored carbonated beverages has also paid off in the marketplace. *Slice,* a carbonated beverage containing 10% fruit juice, commands a 2.5%

*ANN E. PRZYBYLA,*
*Technical Editor*

*(Continued on page 62)*



1 Addition of columns may not agree because of rounding.
Source: IMPACT DATABANK

**Beverage consumption is increasing in the U.S. Chart courtesy of M. Shanken Communications, Inc., New York, NY.**

share of the soft drink market. Lemon/Lime Slice was introduced a little over a year ago and Mandarin Orange Slice was added at the end of 1985. Its rapid acceptance in the marketplace has kept research and development busy creating new varieties. Cherry Cola and Apple are are the newest flavors in the Slice line. They will be available next month. PepsiCo even markets a Mango variety of Slice in Saudia Arabia.

PepsiCo develops all its flavors inhouse at the company's research center in Valhalla, NY. Much of the research is centered around essential oil—a major source of natural flavors. Of the 50,000 tons of essential oils produced worldwide, approximately 14,000 tons are used in the soft drink industry.

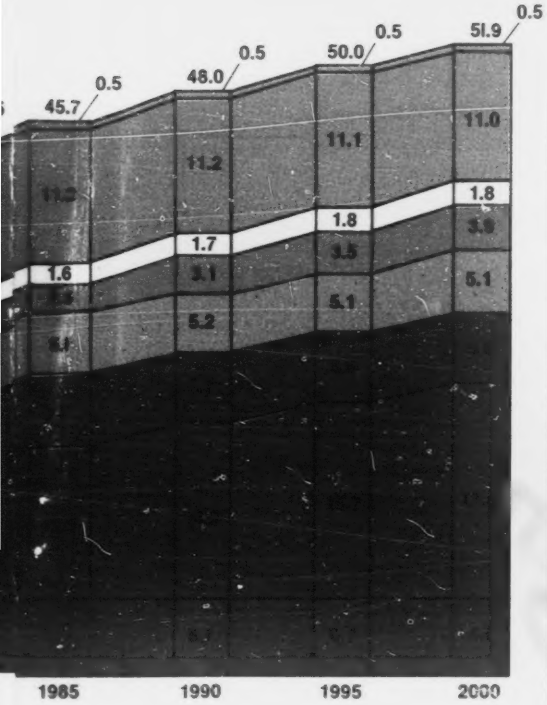
In discussing the flavor development necessary to develop Slice, Johannes A. Buchel, vice president of international research and development for PepsiCo, commented that there is a preference for "natural" flavors because consumers feel that natural tastes better. Diet Slice, for example, contains 1% sugar which comes from the 10% fruit juice since no sugar is added. The natural sugar from the fruit also improves the product's taste, continued Buchel. Lemon/Lime, Mandarin Orange, and Apple Slice contain only natural flavors; while Cherry Cola Slice contains natural and artificial flavors. Apple Slice contains apple juice, and natural apple essence with other natural flavors (WONF).

## Flavors fortify juice

Depending on the type of juice, at least 5% juice needs to be in a drink for the juice to significantly contribute to the flavor, points out Jan-Willem Veraar, product manager at Naarden International Flavors, Inc. At the same time, the success of juice-containing beverages have kept numerous flavor suppliers scrambling to develop natural fruit flavors to reinforce the juice's flavor in soft drinks containing fruit juice at low levels. And natural flavors are what the manufacturers are looking for because the actual fruit juice in the soft drink is usually marketed as a health benefit and, therefore, marketing wants an "all natural" product.

Squirt & Company, Holland, Michigan, has developed a patented process for adding flavors lost during processing back to drinks after pasteurization. Due to the heat used in processing, flavors components are lost during the manufacturing of juices and juice drinks. Squirt determined what flavor components were lost and developed a method for combining and adding these flavor components after pasteurization. The company is using this flavor-enhancement process in the manufacture of its *SUNGLO* 100% Orange Juice, Unfrozen Orange Juice Concentrate, 10% Orange Drink, 10% Fruit Punch, and 10% Grape Drink.

Wine coolers are another example of where experimenting with new flavors in beverages has paid off. Wine Cooler consumption jumped from 200,000 gallons in 1982 to 6.6 million gallons just one year later, and is expected to reach 83.5 million gallons by 1993, according to a report by Business Trend Analysts—a Commack, New York-based market research



firm. Here again, flavors are needed to reinforce the flavor of the added fruit juice.

## Natural flavor development

Development of fruit flavors begins with the actual fruit—an extract is made and evaluated. This evaluation involves sophisticated analytical techniques such as liquid and/or gas chromatography, mass spectroscopy, head space analysis, infrared analysis, and others. But to meet the demand for natural flavors, it has been necessary to find sources for the flavor other than the original fruit. For example, the cinnamic aldehyde is extracted from the bark of cassia trees found in China and this is further broken down to obtain benzaldehyde—commonly associated with cherry flavor in this country.

A natural fruit flavor may be: totally extracted from the actual fruit; an extract from the fruit with added compounds from other natural sources; or made up completely from other natural sources with natural compounds. If a natural compound is used which does not come from the fruit, then the flavor must be labeled WONF (with other natural flavors). An example would be adding oil tagette (found in marigolds) to an apple concentrate to strengthen the flavor. It would then be called Apple WONF flavor.

Selection of compounds in flavor development is determined, in part, by what type of end flavor is desired and the system it will be used in. For example, a strawberry flavor could require a jammy "note" or perhaps a green "note." Standard citrus flavors have become quite sophisticated—they may now be juicier, pulpier, or peelier, points out Thomas J. Ulinski, director of flavor development for Florasynth, Inc. He gave two reasons for this: consumers' tastes are becoming more sophisticated, which creates additional demand; and more ingredients are available, enabling the development of more specific flavors.

Most new aromatic chemicals used in developing natural fruit flavors such as ketones and esters are coming from biotechnology. Short term research in biotechnology involves new fermentation techniques, while long-term biotechnological research is concerned with tissue cultures which may bypass plants altogether.

**Flavors are often used in fruit juice-containing beverages to fortify the fruit flavor. Photo courtesy of Naarden International.**

"Biotechnology has brought about methodology to replace synthetic, organic chemicals which have traditionally been used as flavor building blocks," comments James F. Reynolds, director of marketing for the flavor division of Haarmann & Reimer Corporation.

## Shortages create demand

The heart of the flavor business is standarized flavors because nature is not standard, points out Robert R. Galluzzi of Flavor Resources. In fact, it is shortages of natural products from crops affected by disease or weather conditions that often dictate the direction of flavor research, he continues. When there was a shortage of passion fruit from Hawaii, requests for passion fruit increased. Or, freezing weather in Florida, which reduces the citrus crop, can increase requests for orange or lemon flavor.

Concurrently, the taste of Americans is broadening, and hence, they are more willing to experiment with new flavors. This trend has impacted on fruit-flavored beverages by creating a demand for the exotic. Kalimansi, kiwi, mango, and passion fruit flavors are becoming more popular. And since, as mentioned earlier, fruit flavor development begins with analyzing the actual fruit, samples of these fruits must first be obtained.

*(Continued on page 64)*

# FLAVORS/PART II

**Passion Fruit Juice Drink**

| **Syrup formulation** | |
|---|---|
| Water | 25.63 ml. |
| Sodium Benzoate Solution 25% | .78 ml. |
| High Fructose Corn Sweetener no. 55 | 60.81 ml. |
| Citric Acid Solution 50% | .78 ml. |
| Passion Fruit Flavor 7P-12789 | 12.00 ml. |
| Finished Syrup | 100.00 ml. |
| **Additional data** | |
| Ratio Syrup to Water: | 1 plus 5 equals 6 |
| Carbonation: | 3 volumes of gas |
| Brix: | 11.5 |
| Flavor Declaration: | W.O.N.F. |
| Juice Content: | 10.0% |

The above sample formulation for passion fruit drink was provided by Naarden International.

This is not easy, however. Fresh fruits cannot be imported to this country. So, because tropical fruits are not grown here, they must be imported in another form. Unfortunately, processing them using heat destroys certain volatile flavor compounds. McCormick has overcome this problem by making distillates of tropical fruit at its essential oil operation in Singapore. The essence is then shipped to the U.S. in a frozen form. McCormick can then analyze both the fruit essence and the canned product to determine the effect that heat used in canning the product had on the fruit's flavor.

## Test flavor in end product

Flavor suppliers stress that the ideal situation in developing a flavor for a particular product is to have a sample of that product to test the flavor in, and to know the processing conditions that it will undergo. This is because the system that a flavor is used in has a significant effect on the final "taste" of the product. When a flavor supplier is able to test its flavors in actual products, minor adjustments can be made before the flavor is sent to the customer. This will better assure hitting the target end product.

For example, when a flavor is used in a system containing aspartame, certain precautions need to be taken in developing the flavor since some compounds such as aldehydes will break down in the presences of aspartame, points out Saul Riess of Globe Extracts Company. Also, chemicals that won't react with a particular sweetener may only be effective in a certain pH range. So, the fine tuning of a flavor in, say, a beverage may involve suggesting a slight change in pH or carbonation level.

The amount of heat that a flavor is subjected to during processing will also affect the final flavor of the foods it is used in. The selection of a carrier for a flavor system is also influenced by the heat it will eventually be subjected to. For example, alcohol would not be a good choice as a carrier for a flavor which will undergo extensive heat treatment, while propylene glycol could be used since it is much more heat stable. In other words, the more a flavor supplier knows about a final system, the better able it is to develop a flavor that will work effectively in that system—especially on the first try.

Naarden has worked on developing flavors that withstand the effect of UHT processing which subjects a beverage or other product to temperatures as high as 140 to 150° C. The company has more than 30 years experience in this area since UHT processing has been used in Europe much longer than in this country, and

*(Continued on page 69)*

"Lightweighting" plastic containers may translate into dollars. But that's hardly good news for labeling. Unless...

. . . unless there is a way to stabilize the container during label application. Krones rotary labelers, already well-known for precise, gentle bottle handling, are also available with a pneumatic container pressurizing system that creates this necessary stability. Uncomplicated and reliable, the pressurizing system ensures consistent labeling results and is available with most Krones rotary models. Anything from small cosmetic jars to large detergent containers with front and back labels can be easily handled. Options include code dating, label inspection, bottle orientation and more. Krones' solid reputation and coast-to-coast factory support come as standard. Contact us for details.

This UNIVERSELLA model is easily equipped with pneumatic container pressurizing for empty bottle labeling.

460-316

KRONES

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KRONES, INC., 9600 SOUTH 58TH STREET, FRANKLIN, WISCONSIN 53132. PHONE: 414/421-5650.

Insert 35 or see FEM, p. 211

Insert 36 or see FEM, p. 180 →

Naarden's basic research is done in Holland.

In UHT processing, flavor components from both the added flavor and from the product are lost. This is especially true with the UHT process for direct sterilization by steam injection. By removing the injected steam again, volatile parts of the flavors used are also removed. Research in this area has involved discovering raw flavoring materials that better withstand the heat and, in some cases, "rearrange" those flavor components that are most volatile.

Since flavors can be changed during processing, some work is being done to specifically design flavor molecules so that when undergoing normal processing in home preparation such as microwave cooking or baking, the desired chemical component is generated. This work is referred to as precursor technology and is in the area of artificial flavors. Several fruit flavors have been developed in this area.

## Heatless flavors

Extracting flavor components without using heat has received considerable attention over the past few years. Supercritical extraction (explained in our cover feature in this issue) is being applied to flavor development work by a number of companies. And McCormick has access to two new technologies for isolating flavors—one of which does not involve heat. Through an advanced separation technique, noncitrus flavors and color are being isolated from fruit in a highly concentrated form. And advanced distillation technology is being used to recover volatile isolates from citrus products. This process involves some heat under a high vacuum.

Once the flavor and color are separated from the fruit, individual components can be separated using distillation (the distillation process being applied to citrus products may be adapted to these flavors). The decision by McCormick to implement these technologies on a full scale may be based on acquisitions which would give the company access to the raw materials. The ultimate objective would be to develop the quality of artificial flavors with natural components, says Philip J. Capasso, director of marketing for McCormick/Stange's flavor division.

## Dry mix flavors

Sales of dry beverage mixes increased 20 to 25% with the introduction of aspartame. While dry mix drinks aimed at children—especially flavors associated with red color—have been popular for a long time, a number of new dry mix drinks aimed at adults were introduced once aspartame was approved. These beverages

(Continued on page 71)

**Haarman & Reimer Corporation has extensive flavor research and application laboratories in West Germany.**

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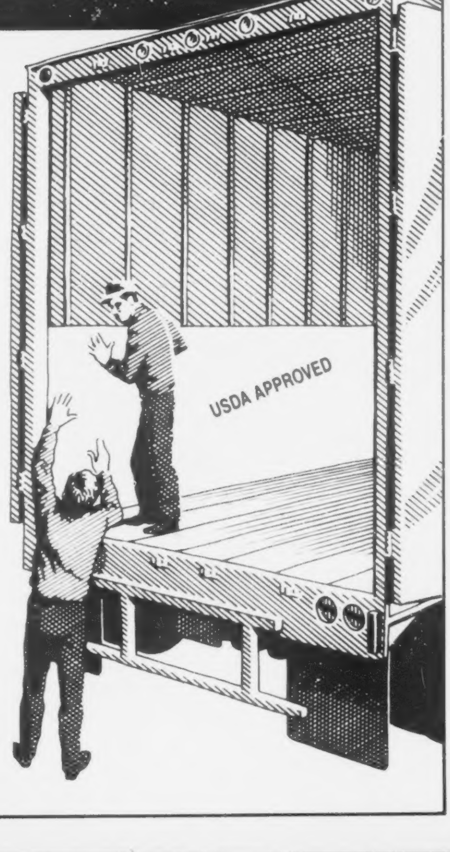

**Insert 37 on Inquiry Card**

require a different flavor profile than those aimed at children—ones that taste more like actual fruits.

Flavors for these products obviously need to be in a dry form. Spray drying or a dry emulsion with flavor droplets distributed in a matrix is commonly used to produce flavors in these situations. Also used is encapsulation which generally produces larger particles and a greater surface-to-volume ratio than spray drying. This is done by altering drying parameters such as inflow rate, amount of solids in the feed, and nozzle size.

Encapsulation enables oil soluble flavors to be readily dissolved in water-based drinks. Encapsulation materials may include modified starches, hydrolyzed starches, natural gums, maltodextrin, or a combination. This material should be bland in flavor and inert. It also is desirable to have as little oil on the droplet's surface as possible since the oil on the droplet is not as well protected and, therefore, shelf life is reduced. Oil comes to the droplet's surface as water is evaporated.

Borden produces a line of encapsulated flavors, Borden *Caps*, which are used in most of the Wyler dry mix drinks among other products. Since some of the volatile top notes are lost during the encapsulation process due to the heat involved, the amount of these top notes is increased in the original emulsion, points out Anand Subramaniam, project leader at the Grocery and Specialty Products Division of Borden, Inc.

## Artificial and natural

Although "natural" is a key to marketing many of today's foods and hence the rise in demand for natural flavors, "natural and artificial" flavors are also receiving attention. Successful products that were on the market before the onslaught of natural products will remain there. Food processors don't want to tamper with success by changing the flavoring system. For one thing, the cost of natural flavors is causing some manufacturers to reevaluate whether or not a new product needs to be flavored only by natural flavors. Several flavor suppliers commented that while a few years ago many requests were for natural flavors only, today they are receiving more where the processor is willing to look at artificial and natural flavors.

New products are a vital to healthy market growth. And, the highly competitive beverages segment is no exception. For example, more variety is a key to soft drinks' increase in market share. And, fruit flavors are playing an important part in the increased popularity of many of these drinks.

**Line of flavors have been specifically developed for wine coolers. Photo courtesy of Ottens Flavors.**

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## ADVISORY

*Our Executive Advisory Panel looks at ingredients buying. They evaluate trends, prices, and new areas of opportunity.*

## INSTRUMENTS

*The tools for lab analysis are becoming more efficient, less time-consuming, and more automated.*

## CHECK OUT

*If you want your products on supermarket shelves, you'll have to prove to their computers that you belong there.*

# Chilton's Food Engineering

**COVER STORY**

This survey of *Food Engineering's* Executive Advisory Board reveals their opinions about current trends and factors that affect ingredient buying patterns.

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**FOOD ENGINEERING**® (ISSN 0193-323X) May 1986, Vol. 58, No. 5. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office

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**25 Budget cuts stifle meat industry**
Cost-cutting at the U.S. Department of Agriculture is being blamed for inhibiting expansion of growing meat and poultry companies.

**33 Rating the food companies**
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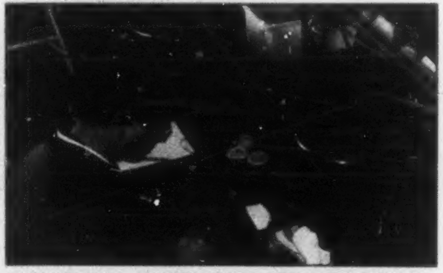

**COUNTER CURRENT EXTRACTION:** This method of extracting soluble solids from fruit has shown dramatic results in increasing yields.

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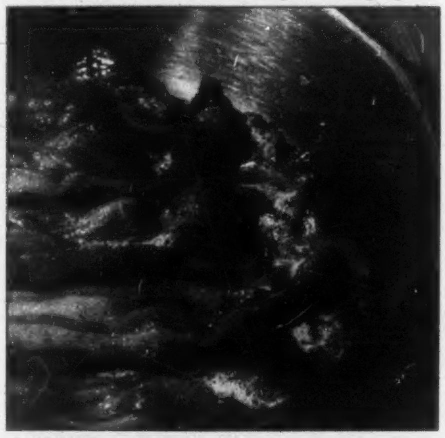
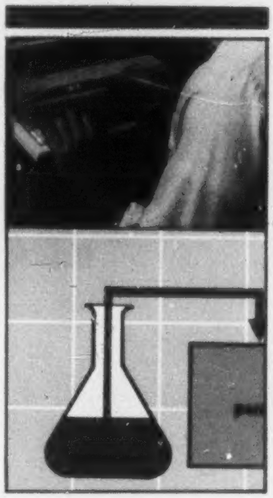


**CURING BACON:** Recent studies have shown that α-tocopherol coated salts are effective in inhibiting N-nitrosamine formation in three types of bacon. **PAGE 68**



*Special Emphasis*

**ANALYTICAL INSTRUMENTATION:**
This month's special emphasis section examines advances in analytical instrumentation and their effects on the analysis of food. **Pages 142 to 148**

# Budget cuts stifle meat industry expansion efforts

Cost-cutting measures inside the U.S. Department of Agriculture are stunting expansion efforts of growing meat and poultry firms.

Due to a hiring freeze, USDA's Food Safety and Inspection Service is relinquishing requests for additional meat and poultry inspection services—a mandate for all meat and poultry processors.

And with an attrition rate of about 50 inspectors per month and $3.4-million in the budget still to cut, FSIS may find it hard to even stay on an even keel. The agency expects to lose 8 percent of its inplant inspection force by October.

## Food firms face difficulties

FSIS Representative Pat Drayne admits the agency is "having difficulty meeting inspection requests."

The red meat and poultry industries—as well as prepared meat product manufacturers—are encountering obstacles. "Our members are having problems receiving additional inspection services," says American Meat Institute Vice President of Fresh Meats Jim Hodges. "This affects their ability to increase line speeds, add shifts and open new plants."

National Broiler Council Representative Kerry Wagner says some of her members, too, are finding their inspection service requests "held in abeyance."

FSIS Representative Drayne predicts that in time, the poultry industry will be the hardest-hit. Poultry production, which increased 5 percent in 1985 alone, is forecasted to grow another 5 percent in 1986, thanks to rising producer profits and increased consumer demand, says the U.S. Department of Commerce.

Adds a National Food Processors Association spokesman: FSIS Administrator Donald Houston "doesn't think he can fulfill requests from processors now sitting on his desk."

## Is there a doctor in the house?

FSIS is proposing a number of legislative remedies:

- *User fees.* Much to the food industry's dismay, FSIS wants to charge slaughter houses for inspection services—traditionally paid for by Uncle Sam. The annual bill would exceed $350-million.

The Reagan Administration supports the user-fee concept, calling the present system nothing more than a "hidden subsidy" for food firms. But Congress, the ultimate decision-maker in this case, has yet to declare a unified position.

- *Two-sided proposal.* FSIS is also asking Congress for ability to vary inspection intensity. Right now, all slaughter houses and processing lines must be inspected continuously—despite volume, type of product and compliance history.

In order to successfully execute this "discretionary inspection" concept, however, FSIS is also asking for jurisdiction to immediately deny inspection services to negligent plants. Food firms vehemently argue against this half of the proposal, claiming it strips businesses of their "due process" rights.

## Food firms speak up

Food firms feel legislation is not the answer. Among *their* solutions:

- *Immediate, discretionary inspection.* NFPA and other industry representatives think FSIS can begin discretionary inspection immediately—without Congressional approval. "We feel FSIS already has the authority it needs," says NFPA President Charles Carey.
- *Stepped-up modernization.* Both industry and FSIS want to accelerate more economical modernization efforts. One new "streamlined" poultry inspection system has reduced the number of inspectors on each young-chicken production line from three to two.

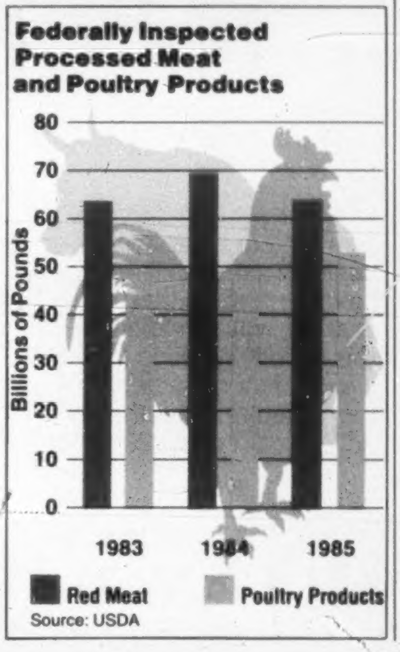
(Continued on next page)

**ESTIMATED USER FEES**
Cost per Carcass

| Species | Inspection Costs | Administrative Cost | Total Costs |
|---|---|---|---|
| [redacted] | [redacted] | [redacted] | [redacted] |
| Poultry | | | |
| Young Chickens | .0205 | .00011 | .0206 |
| Mature Chickens | .0191 | .00010 | .0192 |
| Turkeys | .1068 | .00055 | .1074 |
| Ducks | .0293 | .00015 | .0295 |

SOURCE: USDA

**Budget cuts are forcing USDA to propose transferring the financial burden of mandatory meat and poultry inspection over to the food industry. USDA says 'user fees' can best be collected at the point of slaughter, calculated per carcass (above). Below, demand for processed poultry inspection services is rising—both good and bad news poultry processors. Commerce Dept. economists say this segment will grow 5 percent this year over 1985. But some predict that as budget cuts continue to take effect, and processors cannot receive additional inspection services, the growing poultry industry will suffer most.**



Source: USDA

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Insert 25 or see FEM, p. 39

(Continued from previous page)

Right now, though, streamlining efforts are hindered by financial restrictions on agency resources. Travel, training, salaries, inspection time and laboratory contracts have been drastically limited.

- *Other avenues.* The American Meat Institute has developed a task force that will research user-fee alternatives. The group will focus on slaughter and processing inspection procedures, administration costs and other enforcement programs.

## The future

Unlike many issues grinding through Washington, the meat inspection problem will not take decades to resolve.

Efforts to trim spending so far "just aren't enough," says FSIS Administrator Houston. The agency has no choice but to find lasting solutions, and in the meantime, continue snipping its budget.

Adds FSIS's Drayne: "We'll get through fiscal 1986, which ends September 30, with some difficulties. As for fiscal 1987 and beyond, we just don't know."

## CAPITAL CAPSULES

### USDA announces heptachlor test results

Tests on meat samples for heptachlor residues show that only 12 of 352 samples contain illegal levels of the pesticide. The testing began after the Food and Drug Administration discovered heptachlor in milk from dairy herds in Arkansas, Missouri and Oklahoma. "...There appears to be no widespread problem with heptachlor contamination of the meat supply," said Donald Houston, Food Safety and Inspection Service Administrator. Testing, however, will continue.

### Fruit jelly, preserves, jams identity standards up for review

The Food and Drug Administration is asking you to review and compare the Codex and the existing U.S. standards of identity for fruit jellies, preserves and jams. Comments on the need for change in existing standards—if any—must be received by May 16. *Federal Register, March 17, 1986, Pg. 9063.*

For further information contact Howard Anderson, FDA (202) 485-0118.

### Inotek International Corp. submits food additive petition

The Food and Drug Administration received a petition from Inotek International Corp. proposing that sucrose fatty acid esters be allowed for the preservation of certain fresh fruits. *Federal Register, April 14, 1986, Pg. 12646.*

For further information contact Blondell Anderson, FDA, (202) 426-5487.

**BUYERS' SURVEY**/INGREDIENTS

# SHIFTS COMING FOR PRODUCT DEVELOPMENT

*That's the opinion of FE's Executive Advisory Board. Panel members see the flood of new products continuing, but with formulation changes to counter rising costs.*

FOOD ENGINEERING'S
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PANEL

**FE's Executive Advisory Board, 285 men and women who represent a microcosm of the total food and beverage industry, are helping us to probe trends and buying practices throughout 1986. In this second report, (the first, on capital spending, appeared in January, page 66), we find a shift in ingredient buying patterns, continuing emphasis on new product development, and some surprising reactions to consumer trends such as low-sodium, low-sugar and low-cholesterol foods.**

Like the New York Stock Exchange, the food industry is bullish these days. The motto for product developers, echoing the Dow Jones Index, might be "Onward and upward." But it won't all be roses. A shaky economy, tight money and the current regulatory climate could hamper new product introductions. Furthermore, developing new products is fast becoming the province of large food companies.

That's the consensus of opinion of *Food Engineering's* Executive Advisory Board, 285 men and women who represent a wide range of disciplines, industry branches and company sizes. This panel of food-industry experts recently answered a series of questions about current trends and factors that affect ingredient buying patterns. And a statistical evaluation of their replies by Forge Products Research Division, which conducted the survey, points to a busy year for food marketers.

In general, the outlook for new product development is bright. On the downside, food processors are worried about the growing expense of getting new items into the marketplace. The problem is marketing expense; lack of advertising clout and the rising cost of test marketing make new product introductions more difficult for smaller companies. "Time is money in regards to hitting the market first," notes one panelist. Another suggests that "buyouts of small companies could reduce the number of 'truly' new products."

## Which trends count?

Natural ingredients and low-salt foods are the major new-product trends, according to one facet of FE's survey. When asked to rate seven health-related influences in terms of importance to their own food product development decisions, almost half of the panel members (47.7%) rated "Using Natural Ingredients" highest. Few (4.9%) rated it lowest, giving it a mean rating of 1.97 on a scale of 1-to-5. Bottlers rated using natural ingredients highest of all (60.6%). "The trend will continue toward natural ingredients and colors," says a panelist, "slowed only by the FDA."

Next highest-rated trend (with a mean score of 2.26) was "Reducing the Sodium Content in Foods," followed (at 2.29) by "Formulating Low- or Reduced-Calorie Foods." Packers of canned or frozen fruits, vegetables and entrees were most concerned about sodium, while cutting calories appealed to everyone.

A moderate rating (2.98) was given to "Reducing Cholesterol Levels," with most panel members again agreeing. "Enhancing the Calcium Value of Products," however, although receiving an overall low rating of 3.42, was rated somewhat higher (2.85) by those involved with cereal or grain products. The same group also gave a high rating (2.64) to "Adding Fiber to Foods," which had the lowest (3.59) overall rating. "Fortifying Products with Vitamins," with a 3.56 rating, barely avoided last place—even though 33% of the panel rated it of little or no importance to them.

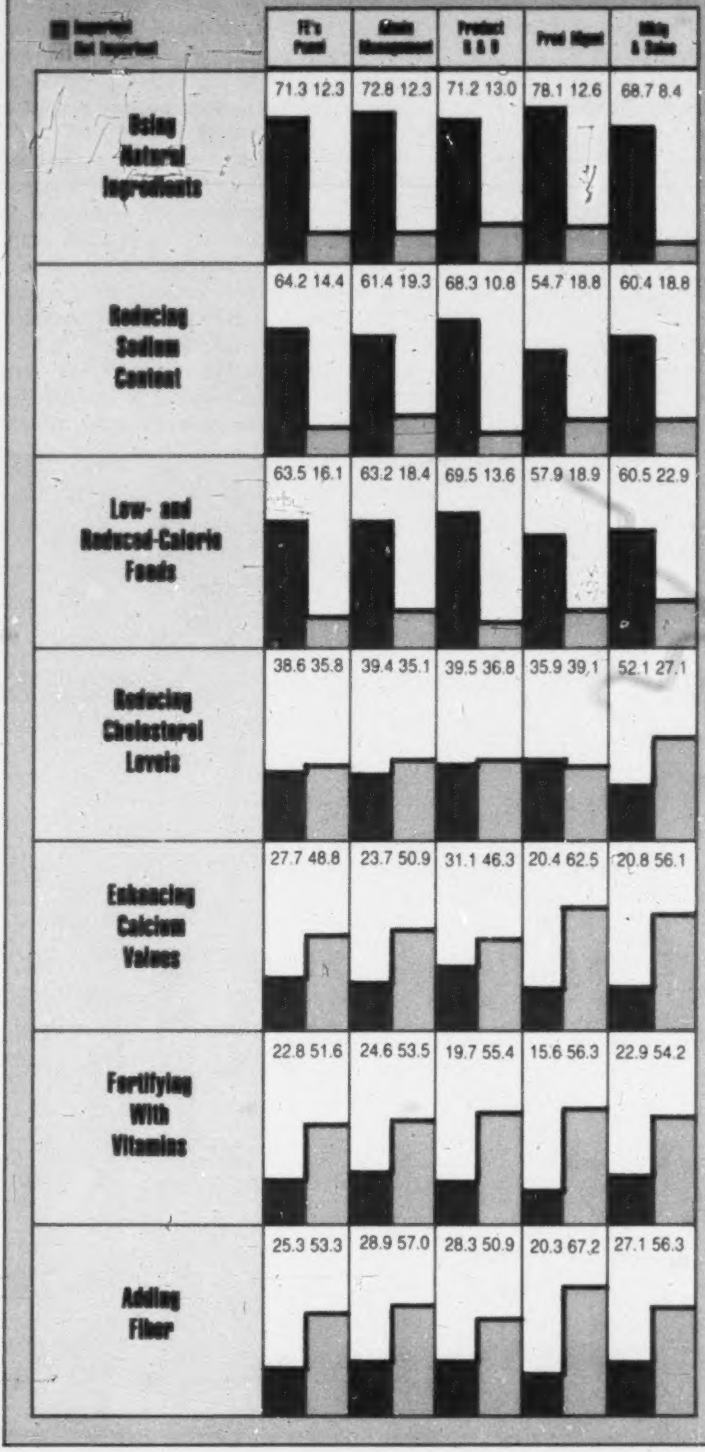
For simplicity, the numbers in the accompanying chart have been combined to emphasize which health-related factors are "important" or "not important." Responses rating an influence either 1 (very important) or 2 (somewhat important) have been lumped together, as have those rating an influence either 4 (not very important) or 5 (of little or no importance).

Asked to name other important trends that are influencing food development, the panelist's answers fell into a pattern. Several mentioned

*KEVIN J. HANNIGAN, Features Editor*

**Product Development Influences**

Here's how Food Engineering's Executive Advisory Panel as a whole—and four specific areas of expertise within the panel—viewed seven major health issues in terms of their importance to food product development decisions.



**Other Product Development Influences**

Here's how FE's Executive Advisory Panel ranked several other new product influences in terms of their importance.

| | |
|---|---|
| Packaging Development | 13.0% |
| Convenience Foods/Packaging | 12.6 |
| Microwave Foods | 10.2 |
| Health Concerns | 9.8 |
| Better Nutritional Value | 7.8 |
| Less Fat, Sodium & Sugar | 5.6 |
| Regulatory Problems | 4.6 |
| All-Natural Ingredients | 3.5 |

packaging development trends (13.0%), and the continuing trend toward convenience foods (12.6%). Others related their comments to trends involving products for microwaves (10.2%), or to health concerns (9.8%).

"We see increased consumer awareness as a definite influence on new product development," said one panel member, "the trend to 'all natural' products wherever possible, along with wholesome, appealing products, rather than 'gimmicky' items." Another cited products that are "fresh, like homemade—especially hard to do with sodium and fat issues."

An obviously thoughtful panelist noted that "There's a greater tendency now to make sure that a new food product (in its conceptual stage) fits into a larger dietary/nutritional scheme rather than to approach it as an isolated product unrelated to other products." To achieve that end, another panel member says, "Companies are now getting into the entire action of a product from making all their own spices, processing their own vegetables and meat (in-plant), along with all packaging."

## Worried about price, supply

Which product development influences panel members see as important or not important becomes significant when compared to the same panel's concern with ingredient prices and supply. Given a list of 24 categories of food ingredients, and asked to check up to three categories in which they were most concerned about rising prices, these food experts most often selected Natural Flavors (33.3%), Seasonings & Spices (26.3%) and Fats & Oils (24.6%). Also high on the "worried" list were Corn Sweeteners (19.3%), Cheese (17.2%), Sucrose Sweeteners (14.4%) and Cocoa (14.4%).

*(Continued on page 92)*

FOOD ENGINEERING'S
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Some categories were mentioned more often, of course, by panelists who were more affected than others. For instance, 50.0% of those making meat products are worried about the cost of Seasonings & Spices, while confectioners are concerned about Fats & Oils (30.6%) and Sucrose Sweeteners (28.6%).

Using the same list, panelists then checked categories in which their companies are now seeking new or additional sources of supply. Generally, their choices parallel concerns about rising prices. Often cited were Natural Flavors (35.4%), Seasonings & Spices (24.2%) and Fats & Oils (21.8%). In some cases, though, their choices were surprising. For instance, only 10.2% were concerned about rising prices for Artificial Flavors, but 23.9% said they're looking for new sources of supply.

## Ingredient systems gaining

Among the comments about "other" trends were several concerning the sources of ingredients. There's a trend toward "cleaner" labels, for example, with either "all-natural" ingredients or fewer additives. The need, said one panel member, is for "more natural ingredients from easily defined sources." Another asked for "more freedom in formulation as long as an accurate descriptive name is used."

FE's panel enlarged on this when discussing ingredient systems—defined as "special sauces, mixes or other preparations where the supplier provides a prepared ingredient comprising a number of different components such as flavors, seasonings, stabilizers, etc."

Ingredient systems do not presently account for a very large share of ingredient purchases, but their use is significant and is expected to grow. Over a quarter (26.0%) of panel members say that their companies do not buy any ingredient systems now, but only about a sixth (17.5%) expect this to be the case in five years. Less than a quarter (24.2%) say that 10% or more of their ingredient purchases are now made as systems, but two out of five (40.3%) expect to buy 10% or more of their ingredients

**[illegible] Price/Supply Concerns**

[illegible] how the food industry sees current ingredient price trends, and what [illegible]. In many cases, even where price is not a major problem, processors are looking for new sources of supply.

▨ Concerned About Prices
■ Seeking New Sources

| | Acidulants | Antioxidants/ Preservatives | Cheese | Cocoa | Colors | Dehydrated Dairy Products | Dehydrated Fruits/Veg. | Emulsifiers | Enzymes | Fats & Oils | Artificial Flavors | Natural Flavors | Flavor Enhancers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Meat Products | 1.2 | 9.3 | 22.1 | 9.3 | 4.7 | 7.0 | 9.3 | 4.7 | 7.0 | 20.9 | 4.7 | 29.1 | 5.8 |
| Bakery Products | 1.1 | 3.3 | 22.8 | 20.7 | 2.2 | 6.5 | 15.2 | 5.4 | 3.3 | 41.3 | 6.5 | 23.9 | 7.6 |
| Dairy Products | 2.3 | 3.4 | 21.8 | 24.1 | 3.4 | 10.3 | 10.3 | 8.0 | 8.0 | 17.2 | 8.0 | 41.4 | 3.4 |
| Flavors/Food Ing. | 4.8 | 9.5 | 21.4 | 14.3 | 7.1 | 4.8 | 16.7 | 7.1 | 7.1 | 19.0 | 10.7 | 38.9 | 8.3 |
| Canned Fruit/Veg. | 6.5 | 6.5 | 21.7 | 13.0 | 4.3 | 4.3 | 13.0 | — | 4.3 | 15.2 | 6.5 | 34.8 | — |
| Fats & Oils | — | 10.2 | 24.5 | 16.3 | 6.1 | — | 12.2 | 8.2 | 6.1 | 44.9 | 10.2 | 26.6 | 2.0 |
| Frozen Fruit/Veg. | 3.6 | 3.8 | 20.8 | 5.7 | — | 5.7 | 17.0 | 1.9 | 7.5 | 9.4 | 9.4 | 34.0 | 5.7 |
| Confectionery Prod. | — | 4.1 | 18.4 | 24.5 | — | 8.2 | 12.2 | 6.1 | 6.1 | 30.6 | 10.2 | 34.7 | 6.1 |
| Cereal/Grain Prod. | 1.8 | 7.0 | 24.6 | 8.8 | 7.0 | 10.5 | 21.1 | 10.5 | 3.5 | 17.5 | 7.0 | 35.8 | 8.6 |
| Beverages | 10.6 | 7.6 | 10.6 | 10.6 | 7.6 | 4.5 | 10.6 | 9.1 | 9.1 | 7.6 | 16.7 | 47.0 | 4.5 |
| Other Food Prod. | 7.0 | 5.6 | 23.9 | 8.5 | 14.1 | 4.2 | 4.2 | 8.5 | 8.9 | 26.8 | 12.7 | 35.2 | 7.0 |
| Total | 3.9 | 6.7 | 17.2 | 14.4 | 5.6 | 6.0 | 9.8 | 5.3 | 6.7 | 24.6 | 10.2 | 33.3 | 4.6 |

this way five years from now.

The meat products category stands out as the one that is most active in making ingredient systems purchases. Over a third (36.0%) of the respondents involved with meat products say that they now purchase 10% or more of their ingredients this way, and over half (57%) will purchase 10% or more this way in 1990.

## Packaging spurs R&D

Packaging was cited again and again as a spur to new product development. "New packaging concepts will allow the marketing of many new products" was a typical comment. Easy-to-handle aseptic and convenience packaging were popular concepts, along with new materials and processes. Microwaveable and single-serve packs, in particular, were cited as influencing new product development.

However, new concepts such as microwaveable packages and barrier plastics may become more important than the products they

(Continued on page 94)

**Ingredient Systems: A Major Trend?**

Ingredient systems—blends or premixes of key ingredients—do not represent a large percentage of ingredient purchases at present. But their use is significant, and should increase in the future.

| [illegible] | Small (less than 100 workers) | | Medium (100-499 workers) | | Large (500 or more workers) | |
|---|---|---|---|---|---|---|
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| 50% or More | [illegible] | [illegible] | 7.5 | [illegible] | 2.3 | [illegible] |

| Gums | | Hydrolized Veg. Proteins | | Modified Starches | | Phosphates | | Salt | | Seasonings & Spices | | Stabilizers | | Corn Sweeteners | | Low-Calorie Sweeteners | | Sucrose Sweeteners | | Vitamin Supplements | |
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FOOD ENGINEERING'S
EXECUTIVE
ADVISORY
PANEL

contain, notes a panelist. And new plastic laminates, although exciting, point up the need for improved antioxidants for some products packaged in less-costly plastic containers.

Rising costs for packaging materials are a problem, too. And not just for consumer packages. Another cry of food professionals is for newer bulk packaging systems that will reduce overall purchasing costs.

Among the value-added characteristics that new packaging can give a product were extended shelf life and safety through improved tamper-evident devices. "Shelf-life considerations in the refrigerated food industry (a fast-growing category) is one factor that greatly influences new product acceptance," explains an FE expert. And there were many calls for "Products that are safety sealed."

## Trends to watch

Now causing changes in the marketplace are new methods of food preparation such as microwave ovens and upscale refrigerated foods such as gourmet salads. Other factors which could lead to new and different food products are new processing methods such as extrusion cooking, membrane separation and irradiation.

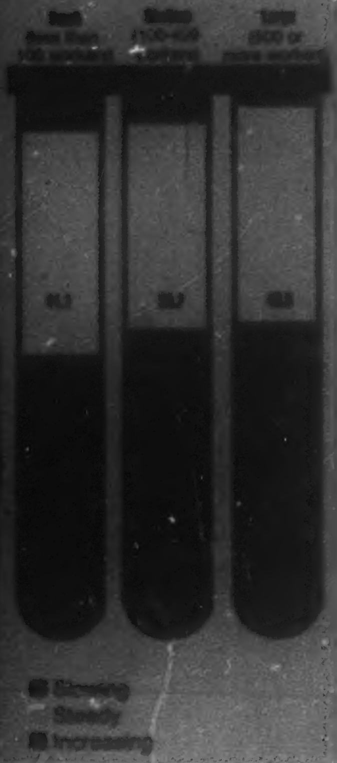
In packaging, smaller units are likely to become more important. "There's a trend to more frequent eating, but of smaller portions," is how one panelist put it. Furthermore, changing demographics point to a need for more "single" meals which are inexpensive yet satisfying while containing fewer than 300 calories.

"The trend toward 'lite' foods is definitely increasing," says a panelist. "No longer satisfied with diet bars or drinks, the consumer is demanding complete meals (instead of components) which are both satisfying and nutritious. An obvious extension would be lite desserts and snacks to complement these."

This trend might include packaging desserts for diabetics that are balanced in terms of dietary needs—with a known amount of cholesterol, fat, salt, sugar, calories, etc. The potential market is about 50-60 million customers.

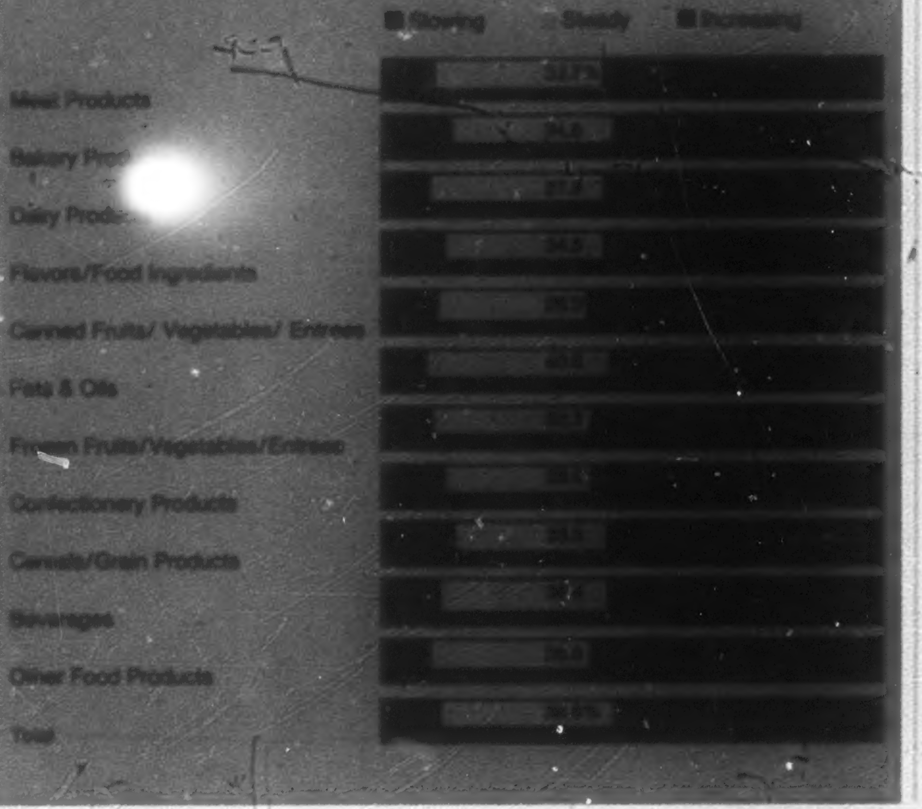
**How New Product Development Activity Is Changing**

Over half of FE's expert panel reports increased new product activity at their companies; only 7.7% say that new product development is slowing down.



**Industry Breakdown of New Product Activity**

According to FE's expert panel, product development activity has increased in 1986 compared to last year. And the trend is consistent for all branches of the food industry.



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JULY 1986

# Food Engineering

In this issue: **ENGINEERED FOODS**

$3.00

## THE NEW ARCHITECTURE OF PROCESS CONTROL

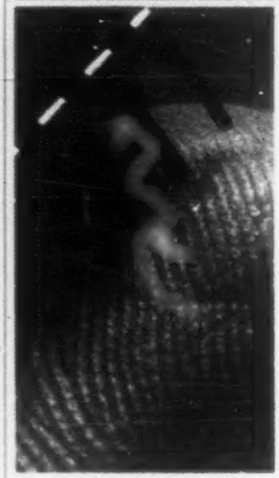
### IN THE LOOP

*The new generation of digital process control, with more distributed control possibilities, allows the processor and the process to be "smarter".*

### THE LONG HAUL

*The key for the fleet manager is low cost of ownership; the right mix of ownership, leasing, and contract hauling; and knowing when to go by road and when by rail.*

# Chilton's Food Engineering



**COVER STORY**

Process control systems are redefining how the food industry handles its manufacturing operations. Computer-controlled systems can now be linked together to achieve a coordinated, more efficient operation.

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**FOOD ENGINEERING®** (ISSN 0193-323X) July 1986, Vol. 60, No. 7. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office ©Chilton Company, 1986. All rights reserved.

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Dr. Anthony J.F. O'Reilly, president and CEO of H.J. Heinz Co., appearing before the New York Society of Security Analysts, reviewed the company's financial performance and discussed its marketing strategy.

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General Foods has established the General Foods World Food Prize to encourage, recognize and reward outstanding contributions that improve that quality, quantity and availability of the world's food supply.

**29 Washington Report**

With the U.S. tax system being overhauled for the first time in 50 years, experts predict it will mean substantially higher after-tax profits for food companies big and small.

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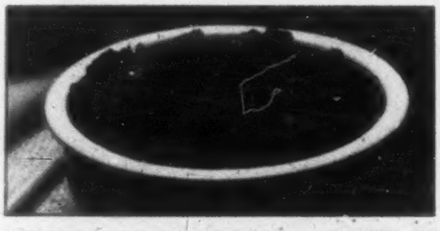

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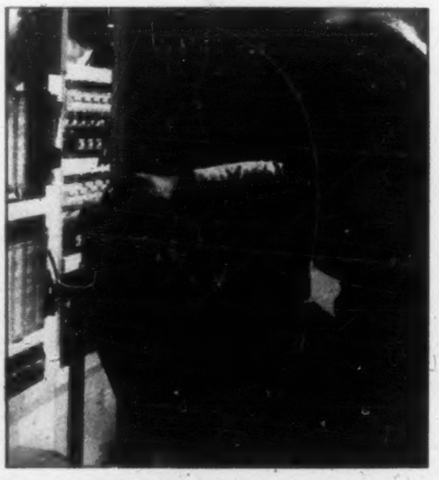
**68 Process Control**

In the past several years, both equipment manufacturers and processors have altered their thinking about process control—both in terms of what it is, and what it should do. And with software being developed to handle an ever-widening range of applications, the options for the use of process control are limitless.

**76 Trucks & Transportation**

*Food Engineering* takes an in-depth look at how the food industry is handling its transportation needs. An exclusive survey with 3,000 distribution managers, an editorial roundtable discussion, and interviews with a cross-section of distribution managers within the industry evidence the ever-increasing importance of the distribution function.



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Ralston Purina's line of isolated soy proteins are customized for functionality in the end product. They are now readily available for test-marketing and regional rollout of products.

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Natural rosemary herb flavorings provide controlled antioxidant properties to mayonnaise, dressings and sauces.

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In *Weight Watchers* successful line of frozen desserts, polydextrose is being used as a filler to take the place of sugar replaced by saccharine.

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This mousse takes only five minutes to prepare and provides an alternative to ordinary instant products.

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Health-conscious consumers are turning more and more to meat-like products produced entirely or partially with tofu.

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The fortification of soft drinks with fruit juice is becoming more prevalent. Why? To satisfy consumer perceptions of better nutrition and to provide a source of vitamin C.

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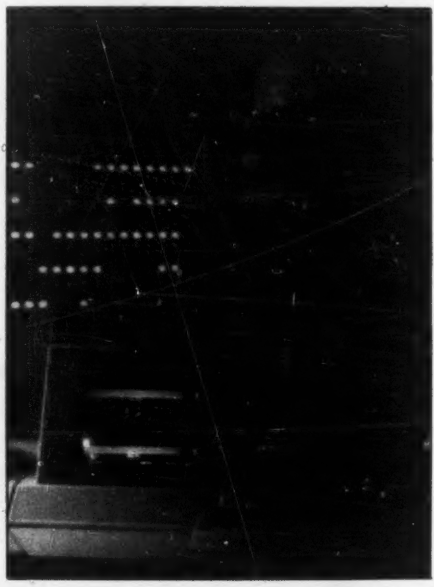

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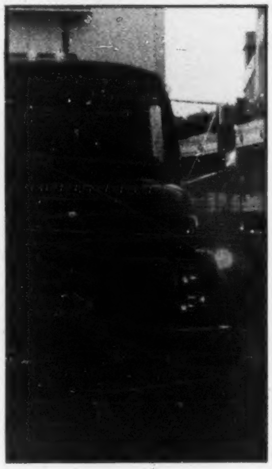


*Special Emphasis*

**TRUCKS & TRANSPORTATION:**
Distribution managers are now, more than ever before, affecting their companies' bottom lines by being innovative in choosing the proper mix of transportation for their products.
**Pages 70 to 88**

*(Continued from page 23)*

role in the development of food products packaged in plastics.

"Recent developments in plastics performance open the door for very exciting changes in the food industry," said Wilmer A. Jenkins, director of the Packaging Products Division of Du Pont's Polymer Products Department. "Convenience, appearance, taste, nutrition, shelf life, cost and a host of other processed food qualities will be dramatically improved in coming years through the use of plastic packaging."

The awards competition will be conducted in cooperation with the National Food Processors Association, a non-profit scientifically based industry organization representing more than 600 food processors and suppliers to the industry. Winners will be announced at the NFPA convention, January 24 to 28, 1987.

Judging for the prizes will be conducted by a panel of experts drawn from the food processing and packaging industries, as well as industry suppliers, educators and members of the trade press. The deadline for entries is November 30, 1986.

Criteria for evaluating entries will include: improvements in flavor, taste, aroma and appearance of the food product; making the product easier to use, safer, more nutritious, available to greater numbers of people, less expensive to make, buy or use; extending shelf life; reducing spoilage or waste; and improvements in product retailing.

For further information or to obtain an entry form, call (302) 999-2525.

# Study shows aseptic packaging will continue to grow

Summary Table

**Aseptic Food/Beverage Products**

(millions of units)

| | 1985 | 1990 | 1995 | 1995 % of Total | % AAGR 85-95 |
|---|---|---|---|---|---|
| Dairy | 310 | 505 | 1,525 | .75% | 17.2% |
| Wine/Water | 200 | 1,500 | 2,740 | 4.2% | 30.0% |
| Fruit Juices/Drinks | 3,610 | 4,950 | 6,640 | 17.3% | 6.2% |
| Tomato Prod. | – | 67 | 113 | 5.5% | 11.0% |
| Particulate Foods | 340 | 820 | 1,230 | 25.6% | 3.7% |
| Total | 4,460 | 7,842 | 12,248 | 3.9% | 10.6% |

Source: Business Communications Co., Inc.

**The chart give projections for aseptic packaging by category. Also given is a projected 1995 percent of total by category and average annual growth rates.**

According to a recently published study by the Plastics Research Division of Business Communications Company, Inc., the total market for aseptic packaged foods and beverages will grow at a compound average annual rate of 10.6% between now and 1995. The analysis notes that aseptic food/beverage packaging is still small compared with all other packaging techniques, accounting for only 4.5 billion units out of a total market of 313 billion units in 1985.

## Over 12 billion by '95

However, BCC projects that by 1995, packaging for 12.2 billion units of food/beverage, or 4 percent of the total, will be of the aseptic type. Aseptic packaging for wine/water, dairy and particulate-type foods and beverages will experience even faster average annual rates of growth.

Juices, the major product found in aseptic packages to-date, will be joined by a wide range of low-acid and particulate food products. Fillers capable of handling particulates the size of chili beans or vegetables in stew have created the need for new types of packaging.

## Paperboard innovations

Paperboard packages, according to the report, will continue to represent the most common type of aseptic packaging, as improved barrier materials and closures and new package sizes are introduced. Telescoping straws, peel-off tabs, reclosable packages and more adult-sized containers will allow for additional market expansion of the paperboard package.

Thermoformed containers will experience the most significant growth as new materials and thermoforming technology allow for a wider variety of container shapes and sizes as well as barrier properties. Viscous and particulate products are the most attractive new products to be packaged in thermoformed containers. Baby food in resealable containers is already on the market, and other low-acid particulate products can be expected in the near future, according to Business Communications Co. Soups should also be a major growth product.

## Particulate processing

The introduction of aseptic processing equipment and fillers that can preserve particle integrity will open up a vast segment of of food products to aseptic packaging, says the study. This technology will provide the first real challenge to metal and glass packages.

The study notes that the distribution of aseptically packaged products, particularly single-serve beverages, is changing from the traditional methods. Soft drink bottlers are getting into the act as distributors and/or packagers of aseptic beverages. Vending machines specifically designed for the brick-shaped packages are becoming more common in schools and public facilities.

### Special Emphasis

## TRUCKS & TRANSPORTATION

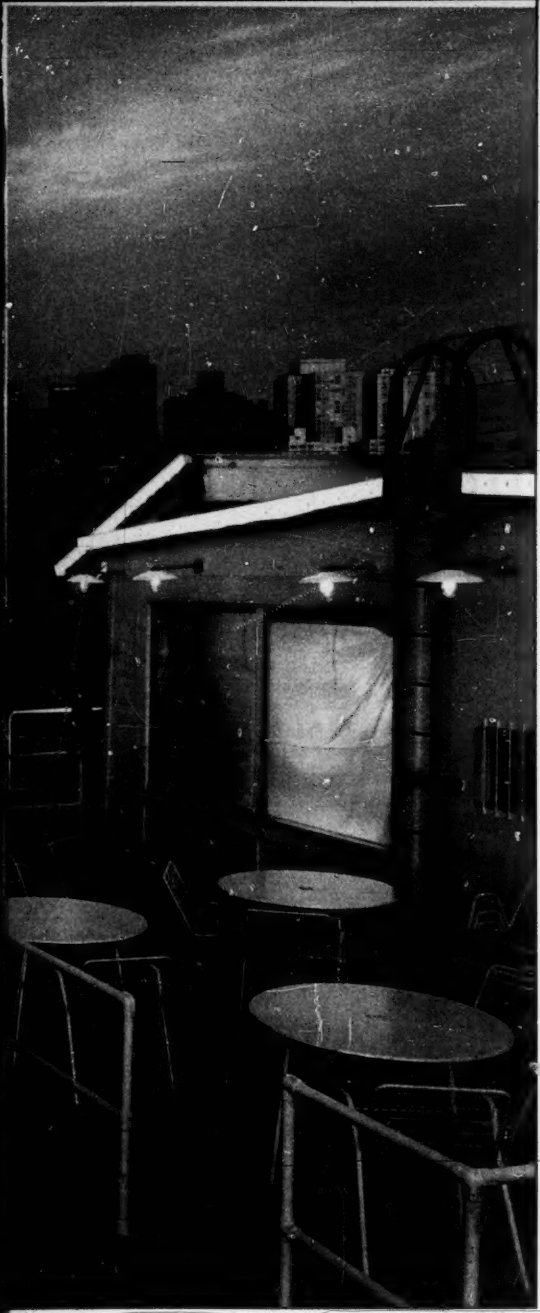
# GAINING THE COMPETITIVE EDGE

*We polled over 3000 distribution managers, interviewed a cross-section of them and took part in a roundtable to discuss transportation in the food industry. We found there are more ways ways than ever to handle your transportation needs. And in a deregulated climate, your options are only limited by your imagination—and your pocketbook.*

Transporation managers, distribution managers and logistics vice presidents are rapidly becoming the lynch pins of the food industry. With manufacturing adopting Just-In-Time techniques, transportation now plays a more vibrant, vital role in the success of any company.

In an industry where it is estimated that distribution represents about 25% of total manufacturing cost, it is evident just how important the distribution operation is. Call it "gaining the competitive edge" or "affecting the bottom line", the effect that

*LINDA K. FREEMAN*
*Managing Editor*



Scott M. Morgan

the distribution area of any company has is more important in 1986 than ever before.

*Food Engineering* took a survey of more than 3,000 distribution managers within the food industry to see how they are handling their transportation needs. More than 10% responded.

Interviews were conducted with a cross-section of distribution managers to see how companies are moving their products on a company-by-company basis. And *FE* led an editorial roundtable (with Ryder Truck Rental, Inc.) to discuss transportation within the food industry *(see sidebar)*.

What we've determined is that there are as many ways to handle transportation as there are companies doing it.

Still, the results of our survey showed that most food companies are using trucks as their primary form of hauling product. The American Trucking Association tells us that trucks haul 80% of all food products – 95% of all bakery products, 90% of dairy products, 75% of canned fruits/vegetables, 50% of grain and mill products and 60% of all beer.

On an individual basis, our survey showed that companies are using a combination of leasing, owning their own fleets, and contracting out the hauling to get the job done. Very few transportation managers are using only one way to move goods, unless it's contracting out.

## Effects of deregulation

Out of 339 respondents to the FE survey, 23.3% use contract hauling 100% of the time to get the job done. Ten years ago you probably would not have gotten that response. What made the difference? The Motor Carrier Act of 1980 deregulating the trucking industry, creating within that industry a competitive climate that had never existed before.

For truckers deregulation proved to be a boon to some and the death knell of others. But it was almost universally a plus to the shipper.

The carriers that have not survived under deregulation failed for a number of reasons. But those carriers who could innovate and provide services needed by the shipper are the survivors.

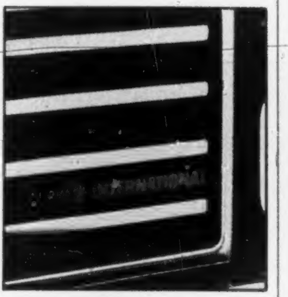
David Thompson, vice president, Distribution & Logistics at Campbell Soup Company puts it clearly: "The emphasis today is more on the quality of the service than the costs. In today's environment, most of the carriers are selling quality and service – on-time pickup and delivery guaranteed."

When polled on our survey, 89.4% of the respondents felt that deregulation of the transportation industry has had a positive effect. The increase in competition among the truckers and more reasonable rates were the two biggest pluses, according to the distribution managers. But a close third was that truckers are taking an active interest in the food industry. The more they learn about it, the better services they can supply. Thus, the shippers reap the benefits of an enlightened carrier.

## Contract hauling

Contract hauling has proved to be the choice of three-quarters of the respondents

*(Continued on page 78)*

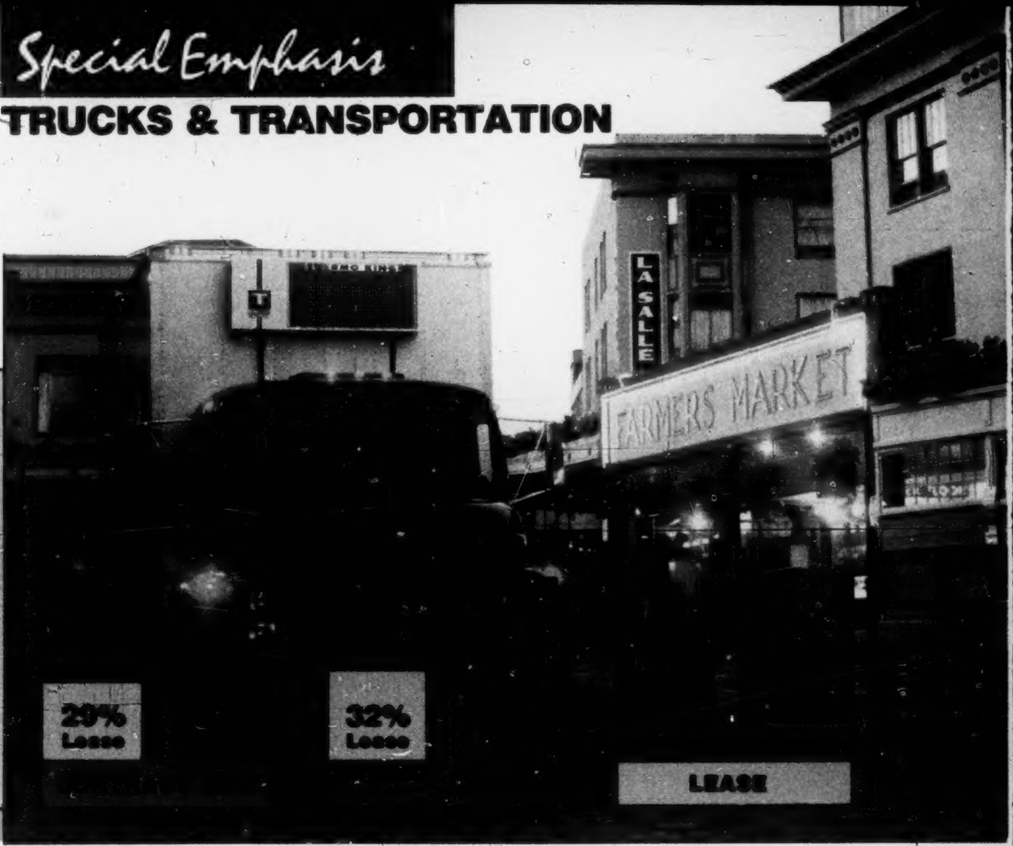


*"We approach our market by providing equipment and service that will offer lower cost of ownership over the life of the truck" . . .* John McDonald, Navistar International.

**Question #1 of the Food Engineering survey asked:**

**"How do you handle your trucking needs?"**

**Virtually all of the respondents use a combination of contract hauling, leasing and fleet ownership. The chart shows the breakdown of each category, i.e., of the total number who contract out, 29% of them also lease and 39% also own their own fleet.**



to the FE survey for moving some or all of their product. Almost universally their reasons were that it was less expensive than owning their own fleet or leasing. "With someone handling your trucking needs for you there is low capital investment, low cost, low overhead," said one respondent.

With deregulation shippers are now better able to negotiate the best price. And with a large pool of carriers to pick from, flexibility is possible.

Our respondents tell us that this meshes particularly well with a company-owned fleet. During peak periods when the fleet cannot haul all that needs to be moved, a short-term contract fills the need.

A primary advantage to contract hauling, say our respondents, is that they do not have to worry about whether or not backhauling can be arranged – the carrier takes care of that. Backhauling can also save money for a company-owned fleet, but the logistics of scheduling and on-time delivery while backhauling can be difficult and sometimes impossible to make cost-effective in a fleet operation. Backhauling, of course, benefits the trucker, too, as his truck is filled on both ends of the trip.

Richard L. Dwyer, area manager of traffic and distribution for Continental Can, is a veteran of 20 years with the company. Continental formed its own transportation subsidiary, Allpoints Distribution Services, Inc. But Dwyer decides when he will use Allpoints and when he won't, depending on how it fits into his overall transportation plan. For example, the Allpoints operation is used for a Chicago to New Jersey run because they can backhaul from New Jersey. But Dwyer would use a common carrier for a shipment to Washington state to make better use of backhaul opportunities.

## Specialized hauling

In a field where competition is fierce and the needs specific, someone who provides specialized services can carve out a niche for themselves. There is a variety of companies who provide specialized services to fit the individual needs of specific companies.

One, Matlack, Inc., is representative of the individualized service available to fill virtually any transportation need. Matlack, who does a lot of contract hauling and also operates on a lease basis, is a bulk commodities shipper, hauling high fructose corn syrup, vegetable oils of varying types, dry sugar and flour in pneumatic trailers, sugar syrup, juices, concentrates, wines and whiskey, among others. They are also providers of intermodal services, unloading from rail to truck for delivery.

Martin C. Hynes, Jr., vice president of marketing, describes their intermodal service like this: At a shipper's location, a product such as HFCS will be loaded onto a rail car and shipped by rail. The HFCS is then stored in the rail car until a Matlack truck arrives and unloads certain amounts for delivery to the company's customers, in priorities set by the shipper: This relieves the shipper of having to offload into specialized trucks and it means the receiver who almost never has rail on-site, can get timely delivery of product.

## Having your own fleet

A sizeable percentage, 46.3%, of our respondents said they maintain their own fleets. Some of the fleets are small and cover just a small percentage of total shipments for the company. Other companies use only their fleets to deliver their products.

"Cost and control" were cited as the two main reasons for owning a fleet. Many felt that you have more direct control of the total operation, including scheduling of maintenance, spacing of trucks, protection of product quality and the ability to respond rapidly to company needs.

But on the downside of owning a fleet, our respondents cited loss of backhauls, high capital investment (both initial expense and replacement costs), the need and expense to maintain a service facility, the expense of having your own drivers, the difficulty of handling peak times, unused equipment during slow times and the high cost of insurance.

## The leasing alternative

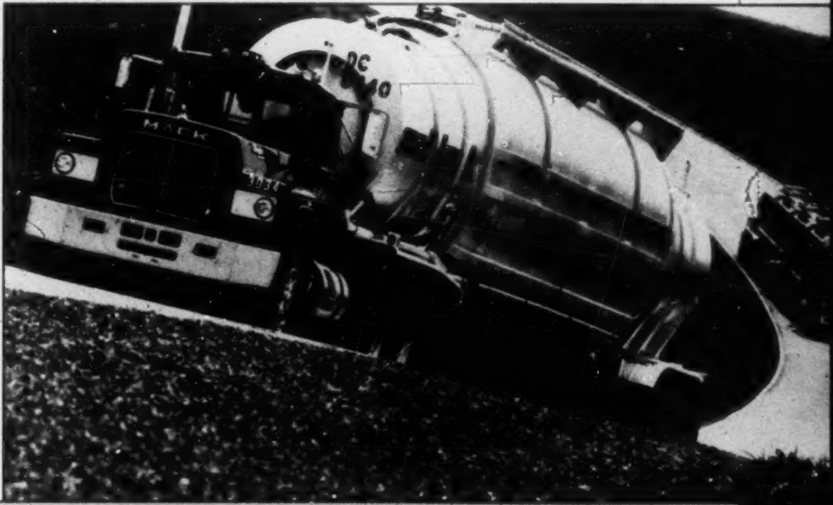
Leasing appears to be the land of opportunity for those supplying transportation to the food industry. A whopping 51.6% of the survey respondents said they do not now lease. Of those who do lease, only 3.8% use leasing for 100% of their needs. The largest percentage of those leasing, 6.5% use leasing for less than 10% of their total transportation requirements. This makes the food industry an area of great potential growth for leasing.

There are some very definite advantages to leasing, say our respondents, including the availability of replacement vehicles as needed, no initial or replacement vehicle costs, no need to maintain a service facility or its personnel, the ability to adjust to seasonal needs, availability of service, and lower insurance costs.

But there are downsides, too, say the respondents, the main detriment being the cost of leasing equipment. Leasing industry sources, however, cite the annual A.T. Kearney "Private Fleet Survey", done for the Private Truck Council, that indicates that "leasing is a somewhat lower cost alternative to truck ownership."

If you ask a leasing company, however, what the impediments are in securing a larger chunk of the transportation requirements of the food industry, they'll tell you it's one of education. "There are a lot of people who don't truly understand leasing and

*(Continued on page 82)*



### How much do you ship by...

| | COMMON CARRIER | | OWN FLEET | | LEASED | |
|---|---|---|---|---|---|---|
| **None** | 64 | 18.9% | 145 | 42.8% | 175 | 51.6% |
| Less than 10% | 9 | 2.7 | 24 | 7.1 | 22 | 6.5 |
| 10% to 19% | 14 | 4.1 | 16 | 4.7 | 12 | 3.5 |
| 20% to 29% | 8 | 2.4 | 10 | 2.9 | 10 | 2.9 |
| 30% to 39% | 8 | 2.4 | 8 | 2.4 | 10 | 2.9 |
| 40% to 49% | 6 | 1.8 | 4 | 1.2 | 3 | 0.9 |
| 50% to 59% | 7 | 2.1 | 9 | 2.7 | 7 | 2.1 |
| 60% to 69% | 8 | 2.4 | 9 | 2.7 | 3 | 0.9 |
| 70% to 79% | 10 | 2.9 | 6 | 1.8 | 6 | 1.8 |
| 80% to 89% | 16 | 4.7 | 7 | 2.1 | 1 | 0.3 |
| 90% to 99% | 44 | 13.0 | 9 | 2.7 | 7 | 2.1 |
| 100% | 79 | 23.3 | 23 | 6.8 | 13 | 3.8 |
| No Answer | 66 | 19.5 | 69 | 20.4 | 70 | 20.6 |
| Total Respondents | 339 | 100.0% | 339 | 100.0% | 339 | 100.0% |

Aggregate Rail Fleet Tonnage Capacity
(Millions of tons as of year end, all railroads plus shippers and equipment lessors)
1965
70 71
76 77
81 82
86
140
135
130
125
120
115
110
105
100
Source
GATX 300343

Food industry use of rail has, for the most part, declined over the years. To counteract this, railroads are trying to be more innovative in responding to specific customer needs and are working to improve on-time performance.

don't understand the benefits of leasing," says Douglas M. Slack, vice president of sales, Ryder Truck Rental, Inc. Ryder uses a computer program to assess a prospect's transportation needs and provide a detailed analysis of whether or not leasing is the best alternative for that company.

There are many different kinds of services available from a leasing company, depending on the specific needs of the customer—including a *Full Service* or *Operating Lease*, *Finance Lease*, contract maintenance, or truck rental. This is one area where leasing companies feel they can best serve the food industry, by tailoring services to fit individual companies. You don't get more service than you want, you don't get less. You get exactly what you need.

Both Slack of Ryder and Hynes of Matlack agree on one thing—it's service that counts. As Hynes says, "Service is more important than rates. It is really more than service; it is quality management in making the movement." Common to both Ryder and Matlack is the idea that leasing is the best choice for a food company distribution manager because it relieves him of the problems of trying to be a transportation company, too.

**What percentage of your products do you ship by rail?**

| | | |
|---|---|---|
| None | 150 | 44.5% |
| Less than 10% | 66 | 19.5 |
| 10% to 19% | 35 | 10.3 |
| 20% to 29% | 21 | 6.2 |
| 30% to 39% | 17 | 5.0 |
| 40% to 49% | 9 | 2.7 |
| 50% to 59% | 6 | 1.8 |
| 60% to 69% | 11 | 3.2 |
| 70% to 79% | 6 | 1.8 |
| 80% to 89% | 2 | 0.6 |
| 90 to 99% | 3 | 0.9 |
| 100% | 1 | 0.3 |
| No Answer | 11 | 3.2 |
| Total Respondents | 338 | 100.0% |

## What about rail?

A dramatic response to FE's survey had to do with the lack of utilization of rail to ship products. Although 55.5% of the respondents use rail, close to 30% of that number use it for less than 19% of their shipping needs. The bulk of the respondents who use rail use it for less than 40% of their needs. Why is this?

Because trains can't meet manufacturing/distribution schedules, says Thompson of Campbell Soup, and many others. Another problem is the length of time the product is in transit, which costs the company money for each day it is being shipped.

But a major complaint of survey respondents and those at the roundtable was the railroads' inability or lack of interest in be-

(Continued on page 84)

ing innovative to fit individual shipper needs.

A roundtable participant commented that "most of the railroads are not very innovative. They'll come to you and give you a program they're marketing. And when you start to tell them what you need, they'll say that's not part of the program."

But deregulation (the Staggers Act) has hit the railroad industry too, heightening the need for innovation, just as in the trucking industry.

Says Joseph Hayes, vice president, marketing, of GATX, "The ability of railroads to establish contract rates, and to be more flexible and sensitive to the needs of shippers, has made the railroads much more cost sensitive, as well as forced them to put greater emphasis on productivity."

And equipment is changing, too. There is the Airslide car, designed to move finely divided dry material like flour, sugar and starch. Thirty years ago when first designed, the Airslide was a 2600 cu. ft. car. Today it is 4900 cu. ft., to provide improved productivity.

Improvements have been made to tank cars, used for large volumes of corn syrup, soybean oil, vegetable oils, tallow, molasses, wine, lard, and liquid sugar. One such improvement is the *BTUniform Coil System* which provides a uniform distribution of heat to protect certain commodities without damaging the lading.

And there is the TankTrain System, a string of interconnected tank cars used to carry a wide variety of commodities.

Other innovations include "double stack" train service. Here light, strong container units are stacked two-high atop a railcar, 200 units to a train. It is estimated that 50% of the cost of conventional freight loading is saved by the use of double stacks.

The CSX Corporation, formed through a merger of the Chessie System and Seaboard Coast Line, created *The Orange Blossom Special*, a train that makes a daily run from Orlando, FL to Wilmington, DE to provide overnight delivery of fresh Florida fruits and vegetables to the northeast. The train is made up of truck trailers loaded with produce sitting on rail flatcars. CSX also owns a trucking unit and a barge line to be able to increase their opportunities to provide intermodal service.

There are certain areas of the food industry where it makes more sense to ship by rail than by other means. But that is not enough to satisfy the railroaders. They'll keep working, they say, to improve on-time delivery and to provide the type of innovative services necessary for them to grow as a supplier to the food industry.

## Low cost of ownership

Whether you're a fleet operator or leasing trucks where you are responsible for maintenance, "low cost of ownership," or LCO, is a vital part of how you accomplish your job. And when you talk to truck manufacturers, LCO is high on their lists for supplying quality equipment.

At Navistar, makers of International trucks, John McDonald, manager of product publicity and company advertising, says that Navistar approaches its market by providing equipment and service that will offer lower cost over the life of the truck. Taken into consideration in determining LCO is initial purchase price, trade-in value, positive tax aspects and support services. And to a company like Navistar that holds, according to McDonald, 26% of the medium to heavy truck market and 33-34% of the cabover market, operating within the parameters of LCO is the difference between heading the pack and running in it.

Derek Kaufman, vice president, marketing, of Freightliner, says that the secret to

(Continued on page 86)

## Innovations in Food Industry Transportation & Distribution

## Editorial Roundtable

**Participants:**

**David L. Anderson**
**Vice President, Logistics**
**Temple, Barker & Sloane, Inc.**

**H. Steven George**
**President**
**Tennessee Cartage Co., Inc.**

**Stephen D. Gould**
**Director of Distribution**
**Pepperidge Farm, Inc.**

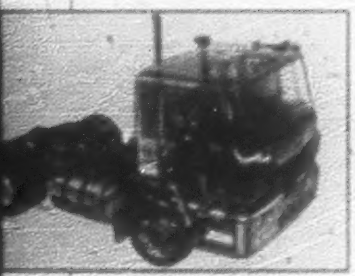
**Fred Keith**
**President**
**Atlanta Bonded Warehouse Company**

**Dennis M. Klinger**
**Vice President, Management Information Systems**
**Ryder Truck Rental, Inc.**

**John C. Langley, Ph.D.**
**Prof. of Marketing/Logistics,**
**University of Tennessee**

**Douglas M. Slack**
**Vice President, Sales**
**Ryder Truck Rental, Inc.**

**David H. Thompson**
**Vice President, Distribution & Logistics**
**Campbell Soup Company**



Volvo White's new line of distribution trucks and tractors will, according to the manufacturer, "provide immediate payback from the minute they hit the road."

LCO is the "total package of how the truck is designed for the job at hand... and also the way it is run." He echoes McDonald's statement that support of the vehicle and the total support system play a vital role.

Kaufman says that one of the best ways to affect LCO is "by careful specing of the truck prior to purchase so you don't have less or more truck than you need." To help their customers, Freightliner offers *SPEC PRO*, which is a computerized Freightliner data book. With this system, a purchaser can sit down and say "...what if" to cover any contingency, and the computer will do a complete analysis.

When Freightliner became a subsidiary of Daimler-Benz AG and started marketing Mercedes-Benz medium-duty (Class 6 & 7) trucks, it greatly expanded its marketing capabilities. With the competition in the Class 8 (heavy duty) field growing ever more intense, the added capability of serving the Class 6 & 7 markets is a real plus. It allows Freightliner to appeal to a broader customer field.

At Mack Truck, long a well-known name in truck tractors, service is the key to success and LCO. To achieve this, a totally electronic command center has been built for Mack Parts Operations to manage the company's worldwide parts operations. In place is *Tandem Non-Stop*, a computer based communications network for instantaneous contact between Mack parts operations and its computer systems. This is expected to better Mack's 94% first-time fill rate for all customer orders. This is just one way Mack sees itself affecting LCO. With instantaneous response, downtime becomes "a distant memory," says Mack.

Volvo White Truck Corporation has introduced the *FE Series* designed to offer LCO by overcoming urban congestion, gridlock and other abuses associated with city traffic, as well as taking into consideration regional transportation where fuel economy and the ability to maintain road speed on highways is important.

### The bottom line

At the roundtable, one of the speakers summed up his estimation of what a distribution manager is looking for: It's 100% quality. "If you expect 100% quality," he said, "that's what you get. If you expect 97%, that's what you're going to get." And with those expectations, distribution is being handled more efficiently and more effectively. That way, everyone comes out a winner. Especially the bottom line.

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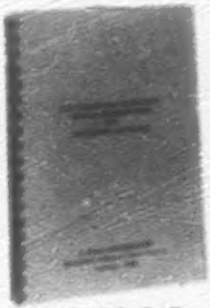

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JULY 1986

# food engineering

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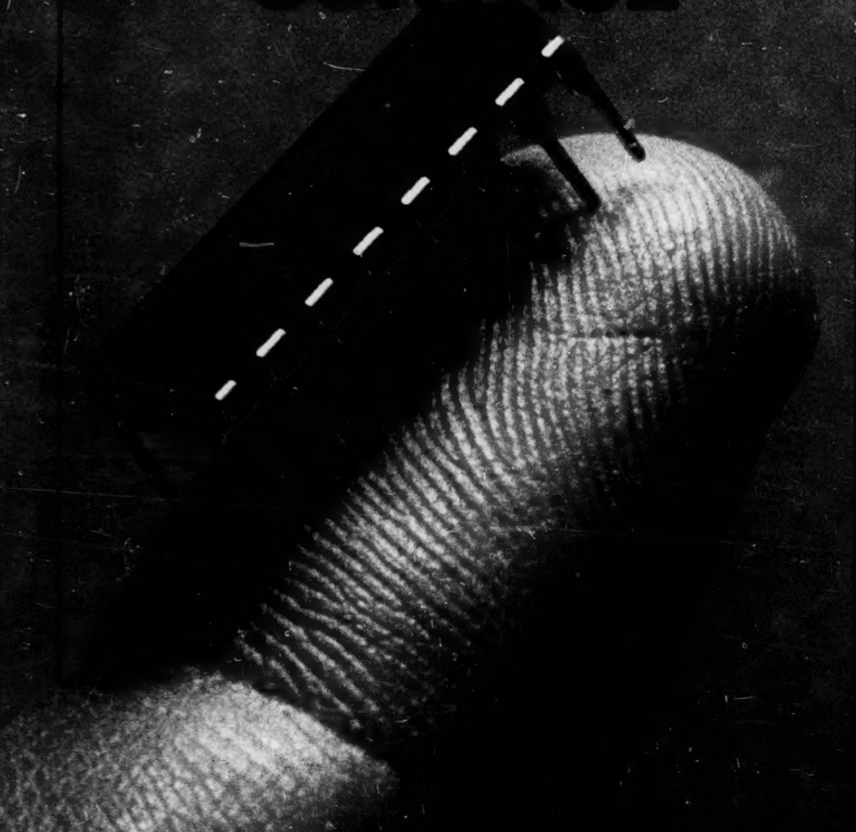
## THE NEW ARCHITECTURE OF PROCESS CONTROL



## IN THE LOOP

*The new generation of digital process control, with more distributed control possibilities, allows the processor and the process to be "smarter".*

## THE LONG HAUL

*The key for the fleet manager is low cost of ownership; the right mix of ownership, leasing, and contract hauling; and knowing when to go by road and when by rail.*

Chilton's
Food
Engineering

**COVER STORY**

Process control systems are redefining how the food industry handles its manufacturing operations. Computer-controlled systems can now be linked together to achieve a coordinated, more efficient operation.

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**FOOD ENGINEERING®** (ISSN 0193-323X) July 1986, Vol. 60, No. 7. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office ©Chilton Company, 1986. All rights reserved.

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## News

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Dr. Anthony J.F. O'Reilly, president and CEO of H.J. Heinz Co., appearing before the New York Society of Security Analysts, reviewed the company's financial performance and discussed its marketing strategy.

**23 Events**

General Foods has established the General Foods World Food Prize to encourage, recognize and reward outstanding contributions that improve that quality, quantity and availability of the world's food supply.

**29 Washington Report**

With the U.S. tax system being overhauled for the first time in 50 years, experts predict it will mean substantially higher after-tax profits for food companies big and small.

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## Features

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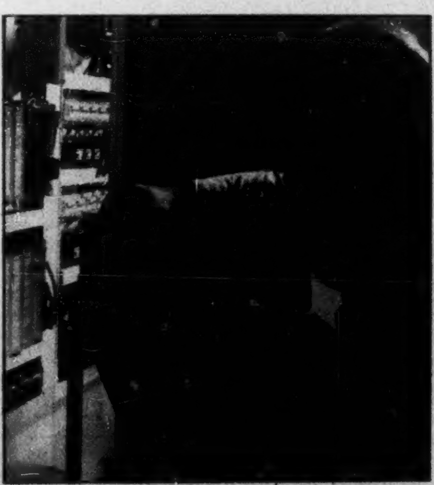
In the past several years, both equipment manufacturers and processors have altered their thinking about process control—both in terms of what it is, and what it should do. And with software being developed to handle an ever-widening range of applications, the options for the use of process control are limitless.

**76 Trucks & Transportation**

*Food Engineering* takes an in-depth look at how the food industry is handling its transportation needs. An exclusive survey with 3,000 distribution managers, an editorial roundtable discussion, and interviews with a cross-section of distribution managers within the industry evidence the ever-increasing importance of the distribution function.



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## Engineered Foods

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Ralston Purina's line of isolated soy proteins are customized for functionality in the end product. They are now readily available for test-marketing and regional rollout of products.

**54 Herbalox**
Natural rosemary herb flavorings provide controlled antioxidant properties to mayonnaise, dressings and sauces.

**55 Polydextrose**
In *Weight Watchers* successful line of frozen desserts, polydextrose is being used as a filler to take the place of sugar replaced by saccharine.

**57 Lite Whip**
This mousse takes only five minutes to prepare and provides an alternative to ordinary instant products.

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Health-conscious consumers are turning more and more to meat-like products produced entirely or partially with tofu.

**65 Fortification**
The fortification of soft drinks with fruit juice is becoming more prevalent. Why? To satisfy consumer perceptions of better nutrition and to provide a source of vitamin C.

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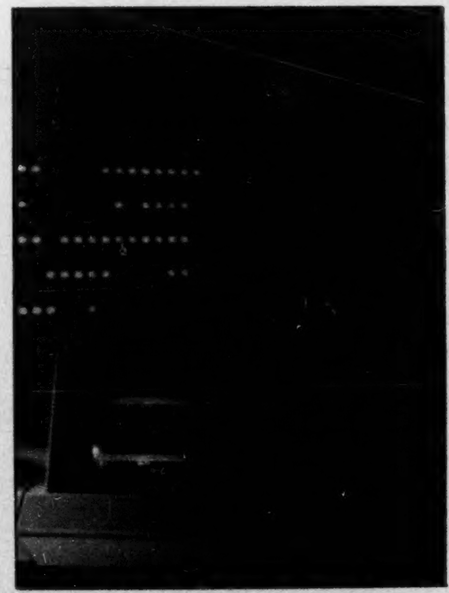


**NEW HFCS PLANT:** **PAGE 94**

*Special Emphasis*

**TRUCKS & TRANSPORTATION:**
Distribution managers are now, more than ever before, affecting their companies' bottom lines by being innovative in choosing the proper mix of transportation for their products.
**Pages 70 to 86**

(Continued from page 23)

role in the development of food products packaged in plastics.

"Recent developments in plastics performance open the door for very exciting changes in the food industry," said Wilmer A. Jenkins, director of the Packaging Products Division of Du Pont's Polymer Products Department. "Convenience, appearance, taste, nutrition, shelf life, cost and a host of other processed food qualities will be dramatically improved in coming years through the use of plastic packaging."

The awards competition will be conducted in cooperation with the National Food Processors Association, a non-profit scientifically based industry organization representing more than 600 food processors and suppliers to the industry. Winners will be announced at the NFPA convention, January 24 to 28, 1987.

Judging for the prizes will be conducted by a panel of experts drawn from the food processing and packaging industries, as well as industry suppliers, educators and members of the trade press. The deadline for entries is November 30, 1986.

Criteria for evaluating entries will include: improvements in flavor, taste, aroma and appearance of the food product; making the product easier to use, safer, more nutritious, available to greater numbers of people, less expensive to make, buy or use; extending shelf life; reducing spoilage or waste; and improvements in product retailing.

For further information or to obtain an entry form, call (302) 999-2525.

# Study shows aseptic packaging will continue to grow

Summary Table

**Aseptic Food/Beverage Products**

(millions of units)

| | 1985 | 1990 | 1995 | 1995 % of Total | % AAGR 85-95 |
|---|---|---|---|---|---|
| Dairy | 310 | 505 | 1,525 | .75% | 17.2% |
| Wine/Water | 200 | 1,500 | 2,740 | 4.2% | 30.0% |
| Fruit Juices/Drinks | 3,610 | 4,950 | 6,640 | 17.3% | 6.2% |
| Tomato Prod. | – | 67 | 113 | 5.5% | 11.0% |
| Particulate Foods | 340 | 820 | 1,230 | 25.6% | 3.7% |
| Total | 4,460 | 7,842 | 12,248 | 3.9% | 10.6% |

Source: Business Communications Co., Inc.

**The chart give projections for aseptic packaging by category. Also given is a projected 1995 percent of total by category and average annual growth rates.**

According to a recently published study by the Plastics Research Division of Business Communications Company, Inc., the total market for aseptic packaged foods and beverages will grow at a compound average annual rate of 10.6% between now and 1995. The analysis notes that aseptic food/beverage packaging is still small compared with all other packaging techniques, accounting for only 4.5 billion units out of a total market of 313 billion units in 1985.

## Over 12 billion by '95

However, BCC projects that by 1995, packaging for 12.2 billion units of food/beverage, or 4 percent of the total, will be of the aseptic type. Aseptic packaging for wine/water, dairy and particulate-type foods and beverages will experience even faster average annual rates of growth.

Juices, the major product found in aseptic packages to-date, will be joined by a wide range of low-acid and particulate food products. Fillers capable of handling particulates the size of chili beans or vegetables in stew have created the need for new types of packaging.

## Paperboard innovations

Paperboard packages, according to the report, will continue to represent the most common type of aseptic packaging, as improved barrier materials and closures and new package sizes are introduced. Telescoping straws, peel-off tabs, reclosable packages and more adult-sized containers will allow for additional market expansion of the paperboard package.

Thermoformed containers will experience the most significant growth as new materials and thermoforming technology allow for a wider variety of container shapes and sizes as well as barrier properties. Viscous and particulate products are the most attractive new products to be packaged in thermoformed containers. Baby food in resealable containers is already on the market, and other low-acid particulate products can be expected in the near future, according to Business Communications Co. Soups should also be a major growth product.

## Particulate processing

The introduction of aseptic processing equipment and fillers that can preserve particle integrity will open up a vast segment of of food products to aseptic packaging, says the study. This technology will provide the first real challenge to metal and glass packages.

The study notes that the distribution of aseptically packaged products, particularly single-serve beverages, is changing from the traditional methods. Soft drink bottlers are getting into the act as distributors and/or packagers of aseptic beverages. Vending machines specifically designed for the brick-shaped packages are becoming more common in schools and public facilities.

*Special Emphasis*

## TRUCKS & TRANSPORTATION

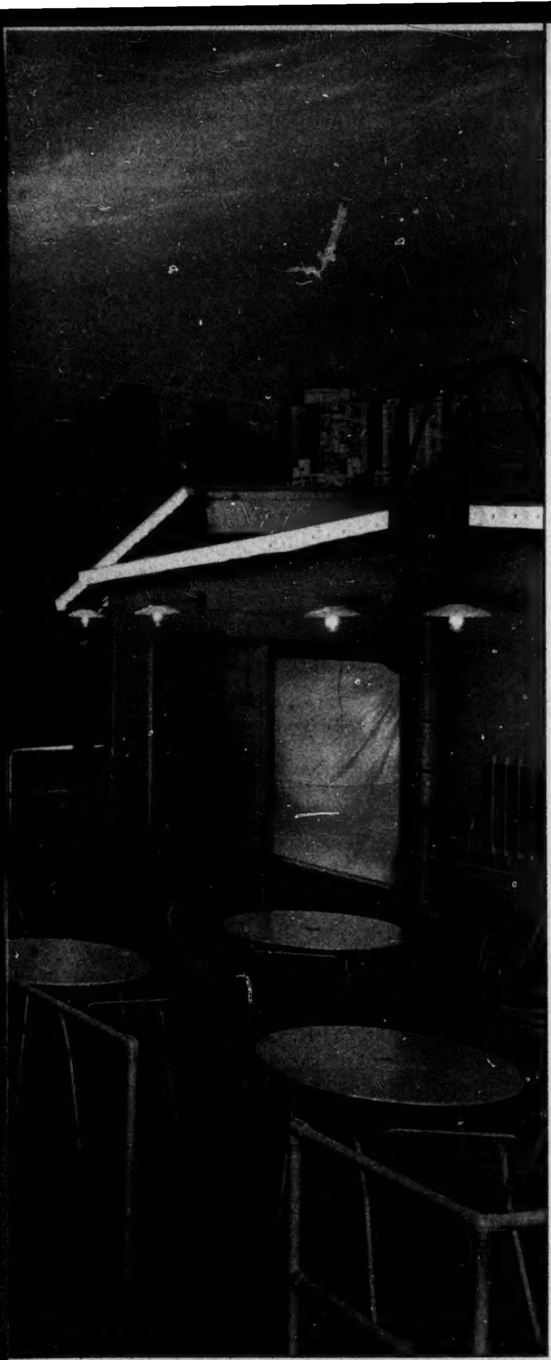
# GAINING THE COMPETITIVE EDGE

*We polled over 3000 distribution managers, interviewed a cross-section of them and took part in a roundtable to discuss transportation in the food industry. We found there are more ways ways than ever to handle your transportation needs. And in a deregulated climate, your options are only limited by your imagination—and your pocketbook.*

Transporation managers, distribution managers and logistics vice presidents are rapidly becoming the lynch pins of the food industry. With manufacturing adopting Just-In-Time techniques, transportation now plays a more vibrant, vital role in the success of any company.

In an industry where it is estimated that distribution represents about 25% of total manufacturing cost, it is evident just how important the distribution operation is. Call it "gaining the competitive edge" or "affecting the bottom line", the effect that

*LINDA K. FREEMAN*
*Managing Editor*



Scott M. Morgan

the distribution area of any company has is more important in 1986 than ever before.

*Food Engineering* took a survey of more than 3,000 distribution managers within the food industry to see how they are handling their transportation needs. More than 10% responded.

Interviews were conducted with a cross-section of distribution managers to see how companies are moving their products on a company-by-company basis. And *FE* led an editorial roundtable (with Ryder Truck Rental, Inc.) to discuss transportation within the food industry *(see sidebar)*.

What we've determined is that there are as many ways to handle transportation as there are companies doing it.

Still, the results of our survey showed that most food companies are using trucks as their primary form of hauling product. The American Trucking Association tells us that trucks haul 80% of all food products–95% of all bakery products, 90% of dairy products, 75% of canned fruits/vegetables, 50% of grain and mill products and 60% of all beer.

On an individual basis, our survey showed that companies are using a combination of leasing, owning their own fleets, and contracting out the hauling to get the job done. Very few transportation managers are using only one way to move goods, unless it's contracting out.

## Effects of deregulation

Out of 339 respondents to the FE survey, 23.3% use contract hauling 100% of the time to get the job done. Ten years ago you probably would not have gotten that response. What made the difference? The Motor Carrier Act of 1980 deregulating the trucking industry, creating within that industry a competitive climate that had never existed before.

For truckers deregulation proved to be a boon to some and the death knell of others. But it was almost universally a plus to the shipper.

The carriers that have not survived under deregulation failed for a number of reasons. But those carriers who could innovate and provide services needed by the shipper are the survivors.

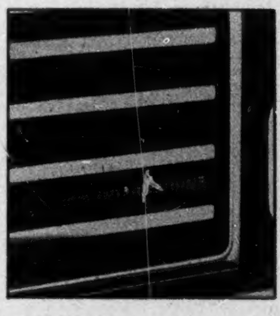
David Thompson, vice president, Distribution & Logistics at Campbell Soup Company puts it clearly: "The emphasis today is more on the quality of the service than the costs. In today's environment, most of the carriers are selling quality and service–on-time pickup and delivery guaranteed."

When polled on our survey, 89.4% of the respondents felt that deregulation of the transportation industry has had a positive effect. The increase in competition among the truckers and more reasonable rates were the two biggest pluses, according to the distribution managers. But a close third was that truckers are taking an active interest in the food industry. The more they learn about it, the better services they can supply. Thus, the shippers reap the benefits of an enlightened carrier.

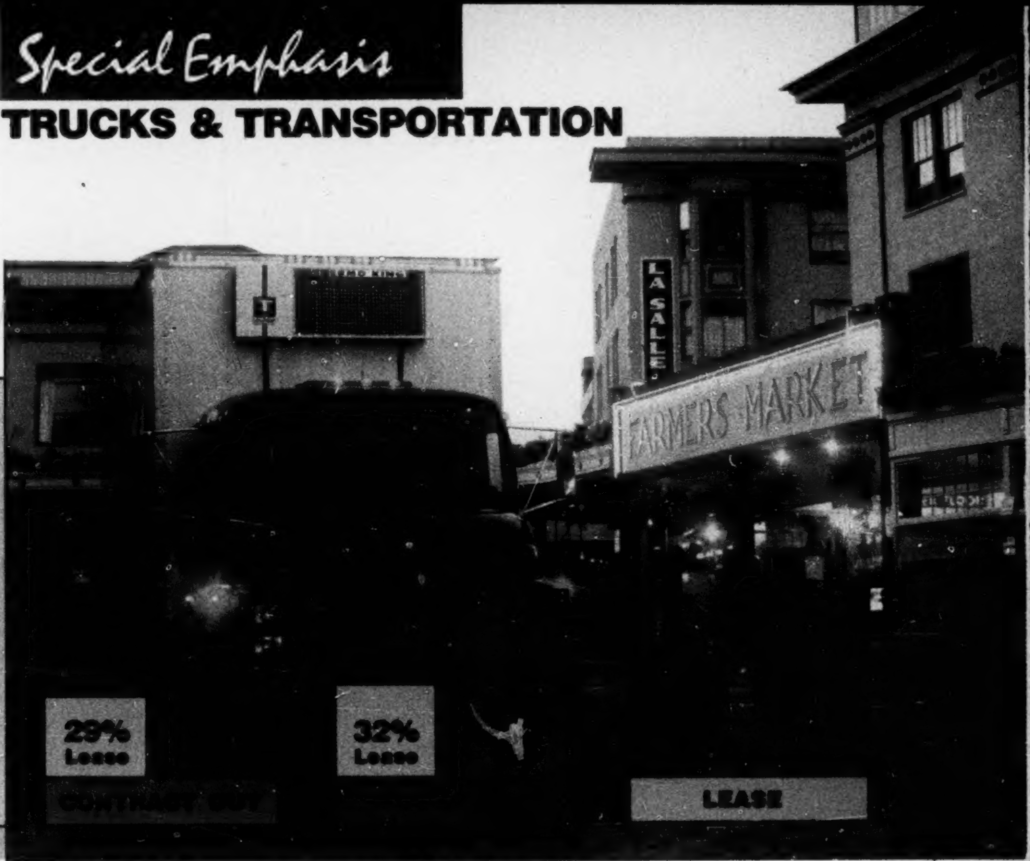
## Contract hauling

Contract hauling has proved to be the choice of three-quarters of the respondents

*(Continued on page 78)*



> *"We approach our market by providing equipment and service that will offer lower cost of ownership over the life of the truck"* . . .
> John McDonald, Navistar International.



**Question #1 of the Food Engineering survey asked:**

**"How do you handle your trucking needs?"**

**Virtually all of the respondents use a combination of contract hauling, leasing and fleet ownership. The chart shows the breakdown of each category, i.e., of the total number who contract out, 29% of them also lease and 39% also own their own fleet.**

to the FE survey for moving some or all of their product. Almost universally their reasons were that it was less expensive than owning their own fleet or leasing. "With someone handling your trucking needs for you there is low capital investment, low cost, low overhead," said one respondent.

With deregulation shippers are now better able to negotiate the best price. And with a large pool of carriers to pick from, flexibility is possible.

Our respondents tell us that this meshes particularly well with a company-owned fleet. During peak periods when the fleet cannot haul all that needs to be moved, a short-term contract fills the need.

A primary advantage to contract hauling, say our respondents, is that they do not have to worry about whether or not backhauling can be arranged – the carrier takes care of that. Backhauling can also save money for a company-owned fleet, but the logistics of scheduling and on-time delivery while backhauling can be difficult and sometimes impossible to make cost-effective in a fleet operation. Backhauling, of course, benefits the trucker, too, as his truck is filled on both ends of the trip.

Richard L. Dwyer, area manager of traffic and distribution for Continental Can, is a veteran of 20 years with the company. Continental formed its own transportation subsidiary, Allpoints Distribution Services, Inc. But Dwyer decides when he will use Allpoints and when he won't, depending on how it fits into his overall transportation plan. For example, the Allpoints operation is used for a Chicago to New Jersey run because they can backhaul from New Jersey. But Dwyer would use a common carrier for a shipment to Washington state to make better use of backhaul opportunities.

## Specialized hauling

In a field where competition is fierce and the needs specific, someone who provides specialized services can carve out a niche for themselves. There is a variety of companies who provide specialized services to fit the individual needs of specific companies.

One, Matlack, Inc., is representative of the individualized service available to fill virtually any transportation need. Matlack, who does a lot of contract hauling and also operates on a lease basis, is a bulk commodities shipper, hauling high fructose corn syrup, vegetable oils of varying types, dry sugar and flour in pneumatic trailers, sugar syrup, juices, concentrates, wines and whiskey, among others. They are also providers of intermodal services, unloading from rail to truck for delivery.

Martin C. Hynes, Jr., vice president of marketing, describes their intermodal service like this: At a shipper's location, a product such as HFCS will be loaded onto a rail car and shipped by rail. The HFCS is then stored in the rail car until a Matlack truck arrives and unloads certain amounts for delivery to the company's customers, in priorities set by the shipper: This relieves the shipper of having to offload into specialized trucks and it means the receiver, who almost never has rail on-site, can get timely delivery of product.

## Having your own fleet

A sizeable percentage, 46.3%, of our respondents said they maintain their own fleets. Some of the fleets are small and cover just a small percentage of total shipments for the company. Other companies use only their fleets to deliver their products.

"Cost and control" were cited as the two main reasons for owning a fleet. Many felt that you have more direct control of the total operation, including scheduling of maintenance, spacing of trucks, protection of product quality and the ability to respond rapidly to company needs.

But on the downside of owning a fleet, our respondents cited loss of backhauls, high capital investment (both initial expense and replacement costs), the need and expense to maintain a service facility, the expense of having your own drivers, the difficulty of handling peak times, unused equipment during slow times and the high cost of insurance.

## The leasing alternative

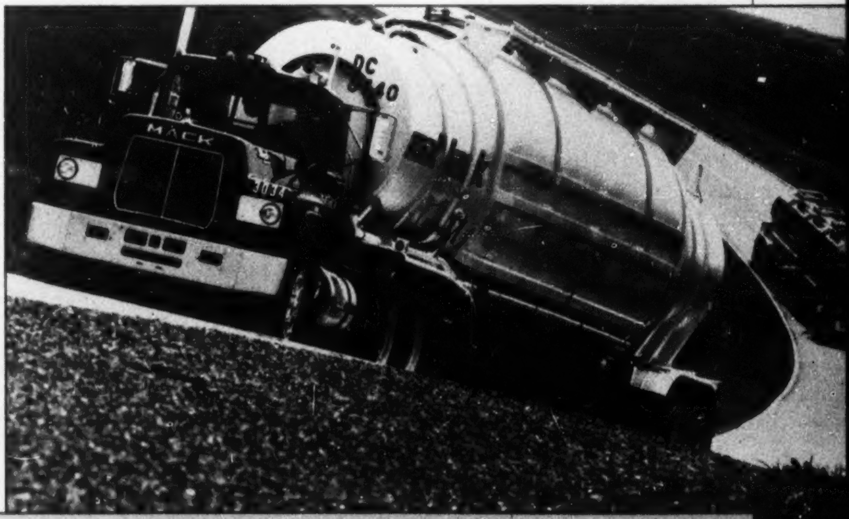
Leasing appears to be the land of opportunity for those supplying transportation to the food industry. A whopping 51.6% of the survey respondents said they do not now lease. Of those who do lease, only 3.8% use leasing for 100% of their needs. The largest percentage of those leasing, 6.5% use leasing for less than 10% of their total transportation requirements. This makes the food industry an area of great potential growth for leasing.

There are some very definite advantages to leasing, say our respondents, including the availability of replacement vehicles as needed, no initial or replacement vehicle costs, no need to maintain a service facility or its personnel, the ability to adjust to seasonal needs, availability of service, and lower insurance costs.

But there are downsides, too, say the respondents, the main detriment being the cost of leasing equipment. Leasing industry sources, however, cite the annual A.T. Kearney "Private Fleet Survey", done for the Private Truck Council, that indicates that "leasing is a somewhat lower cost alternative to truck ownership."

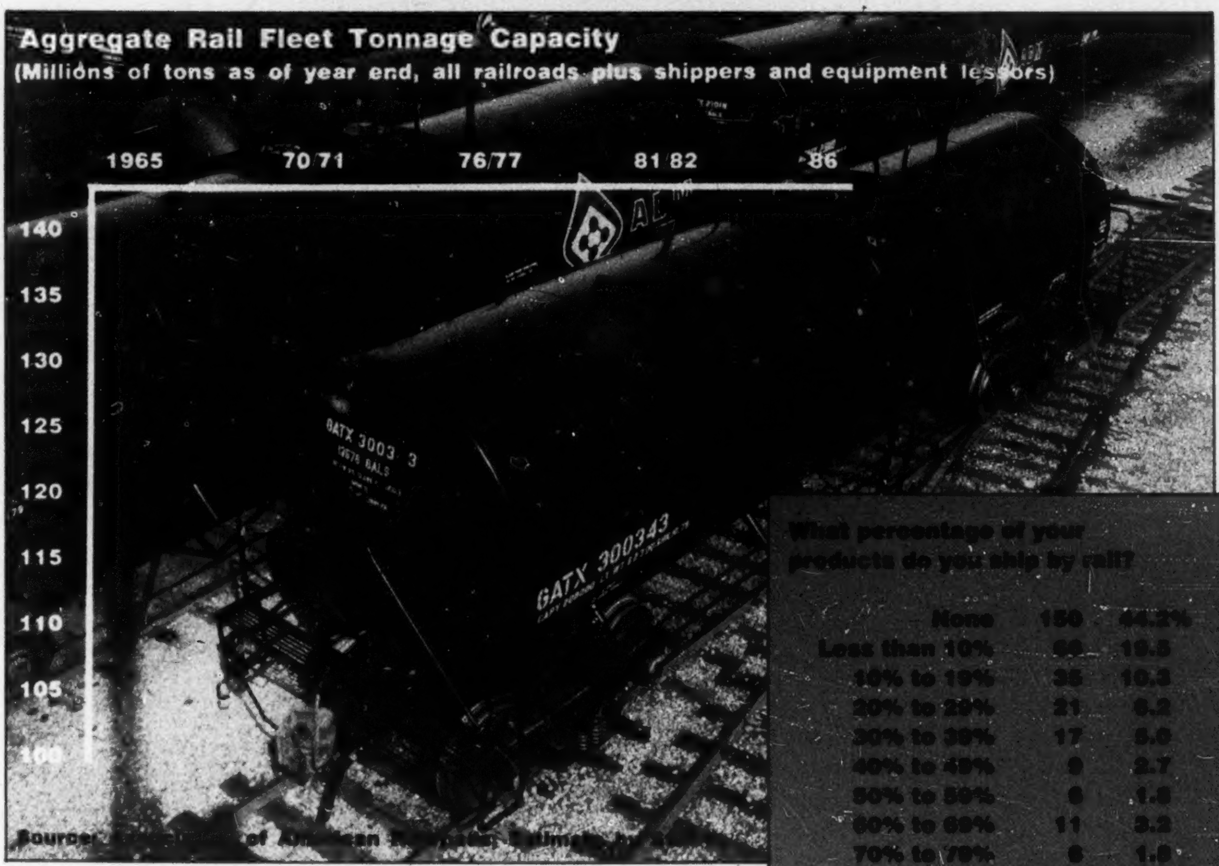
If you ask a leasing company, however, what the impediments are in securing a larger chunk of the transportation requirements of the food industry, they'll tell you it's one of education. "There are a lot of people who don't truly understand leasing and

*(Continued on page 82)*



**How much do you ship by...**

| | COMMON CARRIER | | OWN FLEET | | LEASED | |
|---|---|---|---|---|---|---|
| None | 64 | 18.9% | 145 | 42.8% | 175 | 51.6% |
| Less than 10% | 9 | 2.7 | 24 | 7.1 | 22 | 6.5 |
| 10% to 19% | 14 | 4.1 | 16 | 4.7 | 12 | 3.5 |
| 20% to 29% | 8 | 2.4 | 10 | 2.9 | 10 | 2.9 |
| 30% to 39% | 8 | 2.4 | 8 | 2.4 | 10 | 2.9 |
| 40% to 49% | 6 | 1.8 | 4 | 1.2 | 3 | 0.9 |
| 50% to 59% | 7 | 2.1 | 9 | 2.7 | 7 | 2.1 |
| 60% to 69% | 8 | 2.4 | 9 | 2.7 | 3 | 0.9 |
| 70% to 79% | 10 | 2.9 | 6 | 1.8 | 6 | 1.8 |
| 80% to 89% | 16 | 4.7 | 7 | 2.1 | 1 | 0.3 |
| 90% to 99% | 44 | 13.0 | 9 | 2.7 | 7 | 2.1 |
| 100% | 79 | 23.3 | 23 | 6.8 | 13 | 3.8 |
| No Answer | 66 | 19.5 | 69 | 20.4 | 70 | 20.6 |
| Total Respondents | 339 | 100.0% | 339 | 100.0% | 339 | 100.0% |



**Aggregate Rail Fleet Tonnage Capacity**
(Millions of tons as of year end, all railroads plus shippers and equipment lessors)

Source: [illegible] of American [illegible], Estimate by [illegible]

**What percentage of your products do you ship by rail?**

| | | |
|---|---|---|
| None | 150 | 44.2% |
| Less than 10% | 66 | 19.5 |
| 10% to 19% | 35 | 10.3 |
| 20% to 29% | 21 | 6.2 |
| 30% to 39% | 17 | 5.0 |
| 40% to 49% | 9 | 2.7 |
| 50% to 59% | 6 | 1.8 |
| 60% to 69% | 11 | 3.2 |
| 70% to 79% | 6 | 1.8 |
| 80% to 89% | 3 | 0.9 |
| 90 to 99% | 3 | 0.9 |
| 100% | 1 | 0.3 |
| No Answer | 11 | 3.2 |
| Total Respondents | 339 | 100.0% |

**Food industry use of rail has, for the most part, declined over the years. To counteract this, railroads are trying to be more innovative in responding to specific customer needs and are working to improve on-time performance.**

don't understand the benefits of leasing," says Douglas M. Slack, vice president of sales, Ryder Truck Rental, Inc. Ryder uses a computer program to assess a prospect's transportation needs and provide a detailed analysis of whether or not leasing is the best alternative for that company.

There are many different kinds of services available from a leasing company, depending on the specific needs of the customer—including a *Full Service* or *Operating Lease*, *Finance Lease*, contract maintenance, or truck rental. This is one area where leasing companies feel they can best serve the food industry, by tailoring services to fit individual companies. You don't get more service than you want, you don't get less. You get exactly what you need.

Both Slack of Ryder and Hynes of Matlack agree on one thing—it's service that counts. As Hynes says, "Service is more important than rates. It is really more than service; it is quality management in making the movement." Common to both Ryder and Matlack is the idea that leasing is the best choice for a food company distribution manager because it relieves him of the problems of trying to be a transportation company, too.

## What about rail?

A dramatic response to FE's survey had to do with the lack of utilization of rail to ship products. Although 55.5% of the respondents use rail, close to 30% of that number use it for less than 19% of their shipping needs. The bulk of the respondents who use rail use it for less than 40% of their needs. Why is this?

Because trains can't meet manufacturing/distribution schedules, says Thompson of Campbell Soup, and many others. Another problem is the length of time the product is in transit, which costs the company money for each day it is being shipped.

But a major complaint of survey respondents and those at the roundtable was the railroads' inability or lack of interest in be-

*(Continued on page 84)*

ing innovative to fit individual shipper needs.

A roundtable participant commented that "most of the railroads are not very innovative. They'll come to you and give you a program they're marketing. And when you start to tell them what you need, they'll say that's not part of the program."

But deregulation (the Staggers Act) has hit the railroad industry too, heightening the need for innovation, just as in the trucking industry.

Says Joseph Hayes, vice president, marketing, of GATX, "The ability of railroads to establish contract rates, and to be more flexible and sensitive to the needs of shippers, has made the railroads much more cost sensitive, as well as forced them to put greater emphasis on productivity."

And equipment is changing, too. There is the Airslide car, designed to move finely divided dry material like flour, sugar and starch. Thirty years ago when first designed, the Airslide was a 2600 cu. ft. car. Today it is 4900 cu. ft., to provide improved productivity.

Improvements have been made to tank cars, used for large volumes of corn syrup, soybean oil, vegetable oils, tallow, molasses, wine, lard, and liquid sugar. One such improvement is the *BTUniform Coil System* which provides a uniform distribution of heat to protect certain commodities without damaging the lading.

And there is the TankTrain System, a string of interconnected tank cars used to carry a wide variety of commodities.

Other innovations include "double stack" train service. Here light, strong container units are stacked two-high atop a railcar, 200 units to a train. It is estimated that 50% of the cost of conventional freight loading is saved by the use of double stacks.

The CSX Corporation, formed through a merger of the Chessie System and Seaboard Coast Line, created *The Orange Blossom Special*, a train that makes a daily run from Orlando, FL to Wilmington, DE to provide overnight delivery of fresh Florida fruits and vegetables to the northeast. The train is made up of truck trailers loaded with produce sitting on rail flatcars. CSX also owns a trucking unit and a barge line to be able to increase their opportunities to provide intermodal service.

There are certain areas of the food industry where it makes more sense to ship by rail than by other means. But that is not enough to satisfy the railroaders. They'll keep working, they say, to improve on-time delivery and to provide the type of innovative services necessary for them to grow as a supplier to the food industry.

## Low cost of ownership

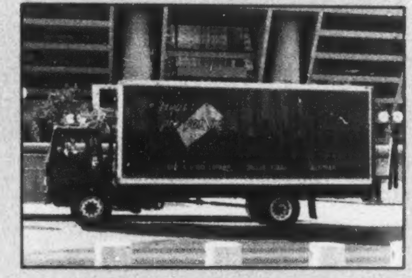
Whether you're a fleet operator or leasing trucks where you are responsible for maintenance, "low cost of ownership," or LCO, is a vital part of how you accomplish your job. And when you talk to truck manufacturers, LCO is high on their lists for supplying quality equipment.

At Navistar, makers of International trucks, John McDonald, manager of product publicity and company advertising, says that Navistar approaches its market by providing equipment and service that will offer lower cost over the life of the truck. Taken into consideration in determining LCO is initial purchase price, trade-in value, positive tax aspects and support services. And to a company like Navistar that holds, according to McDonald, 26% of the medium to heavy truck market and 33-34% of the cabover market, operating within the parameters of LCO is the difference between heading the pack and running in it.

Derek Kaufman, vice president, marketing, of Freightliner, says that the secret to

*(Continued on page 86)*

## Innovations in Food Industry Transportation & Distribution



## Editorial Roundtable

**Participants:**

**David L. Anderson**
**Vice President, Logistics**
**Temple, Barker & Sloane, Inc.**

**H. Steven George**
**President**
**Tennessee Cartage Co., Inc.**

**Stephen D. Gould**
**Director of Distribution**
**Pepperidge Farm, Inc.**

**Fred Keith**
**President**
**Atlanta Bonded Warehouse Company**

**Dennis M. Klinger**
**Vice President, Management Information Systems**
**Ryder Truck Rental, Inc.**

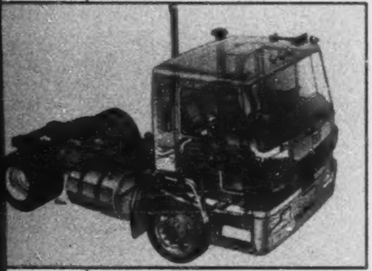
**John C. Langley, Ph.D.**
**Prof. of Marketing/Logistics**
**University of Tennessee**

**Douglas M. Slack**
**Vice President, Sales**
**Ryder Truck Rental, Inc.**

**David H. Thompson**
**Vice President, Distribution & Logistics**
**Campbell Soup Company**

LCO is the "total package of how the truck is designed for the job at hand...and also the way it is run." He echoes McDonald's statement that support of the vehicle and the total support system play a vital role.

Kaufman says that one of the best ways to affect LCO is "by careful specing of the truck prior to purchase so you don't have less or more truck than you need." To help their customers, Freightliner offers *SPEC PRO*, which is a computerized Freightliner data book. With this system, a purchaser can sit down and say "...what if" to cover any contingency, and the computer will do a complete analysis.



Volvo White's new line of distribution trucks and tractors will, according to the manufacturer, "provide immediate payback from the minute they hit the road."

When Freightliner became a subsidiary of Daimler-Benz AG and started marketing Mercedes-Benz medium-duty (Class 6 & 7) trucks, it greatly expanded its marketing capabilities. With the competition in the Class 8 (heavy duty) field growing ever more intense, the added capability of serving the Class 6 & 7 markets is a real plus. It allows Freightliner to appeal to a broader customer field.

At Mack Truck, long a well-known name in truck tractors, service is the key to success and LCO. To achieve this, a totally electronic command center has been built for Mack Parts Operations to manage the company's worldwide parts operations. In place is *Tandem Non-Stop*, a computer based communications network for instantaneous contact between Mack parts operations and its computer systems. This is expected to better Mack's 94% first-time fill rate for all customer orders. This is just one way Mack sees itself affecting LCO. With instantaneous response, downtime becomes "a distant memory," says Mack.

Volvo White Truck Corporation has introduced the *FE Series* designed to offer LCO by overcoming urban congestion, gridlock and other abuses associated with city traffic, as well as taking into consideration regional transportation where fuel economy and the ability to maintain road speed on highways is important.

## The bottom line

At the roundtable, one of the speakers summed up his estimation of what a distribution manager is looking for: It's 100% quality. "If you expect 100% quality," he said, "that's what you get. If you expect 97%, that's what you're going to get." And with those expectations, distribution is being handled more efficiently and more effectively. That way, everyone comes out a winner. Especially the bottom line.

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AUGUST 1986

Chilton's Food Engineering

In this issue: FOOD PACKAGING

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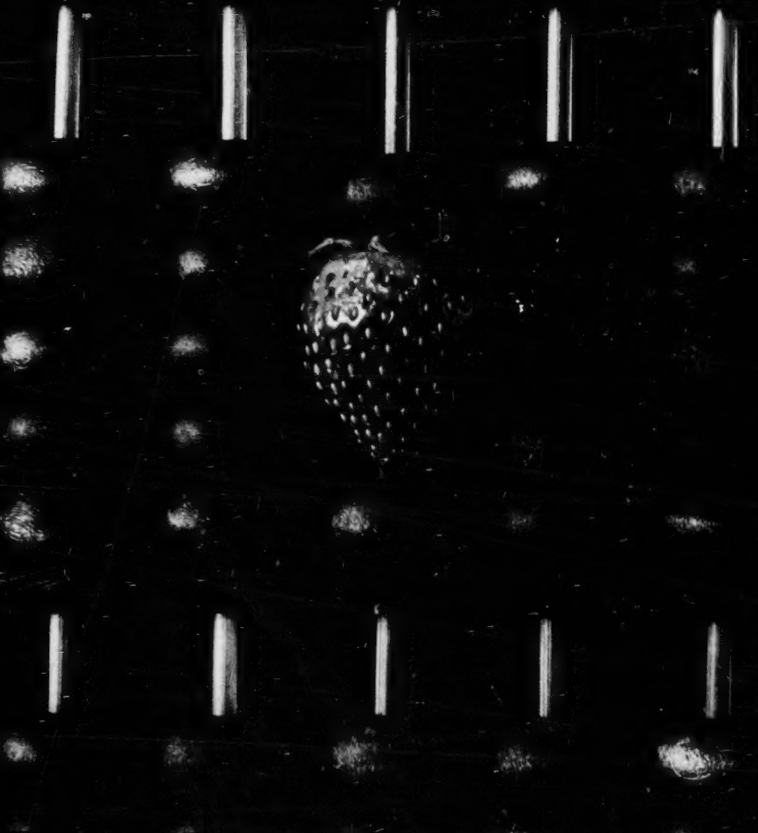
# Annual STATE OF THE FOOD INDUSTRY



## THE WAY WE ARE

*Our seventh review of the dynamics of the various food business segments holds part of the key for understanding where processing is headed in the second half of the decade.*

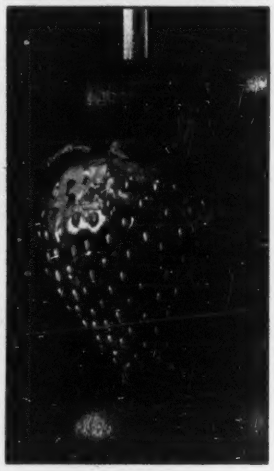
## SHOW ME

*A report, category by category, on the recent IFT Show.*

## BACK TO BASICS

*Special emphasis on gums and other thickeners.*

# Chilton's Food Engineering



**COVER STORY**

*Food Engineering's* coverage of the State of the Industry brings you up-to-date on issues and concerns for processors looking to stay profitable in an increasingly more competitive marketplace.

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**FOOD ENGINEERING®** (ISSN 0193-323X) August 1986, Vol. 58, No. 8. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office ™Chilton Company, 1986. All rights reserved.

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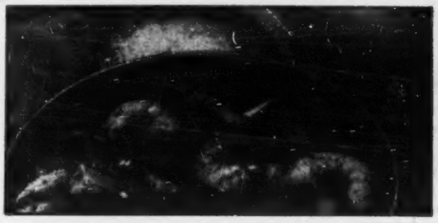

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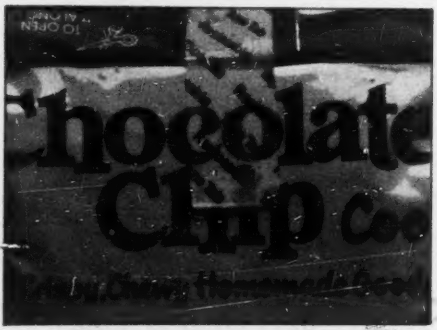

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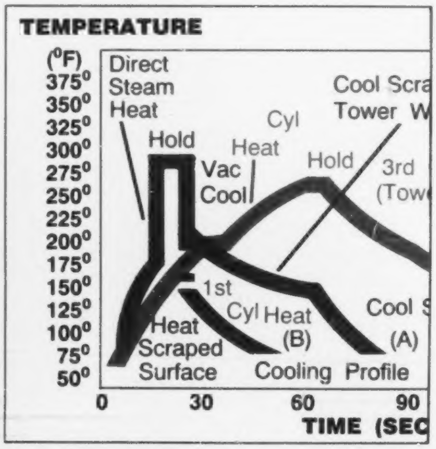

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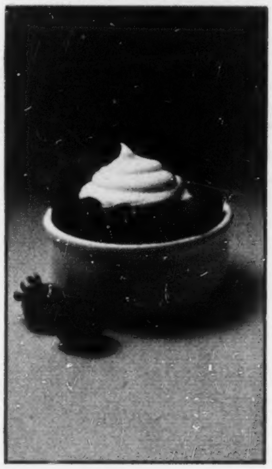

*Special Emphasis*

**GUMS & THICKENERS:**
This month's Special Emphasis section highlights the changing trends in and uses of gums and thickeners. New gum applications are giving product development people something new to stir their creativity.
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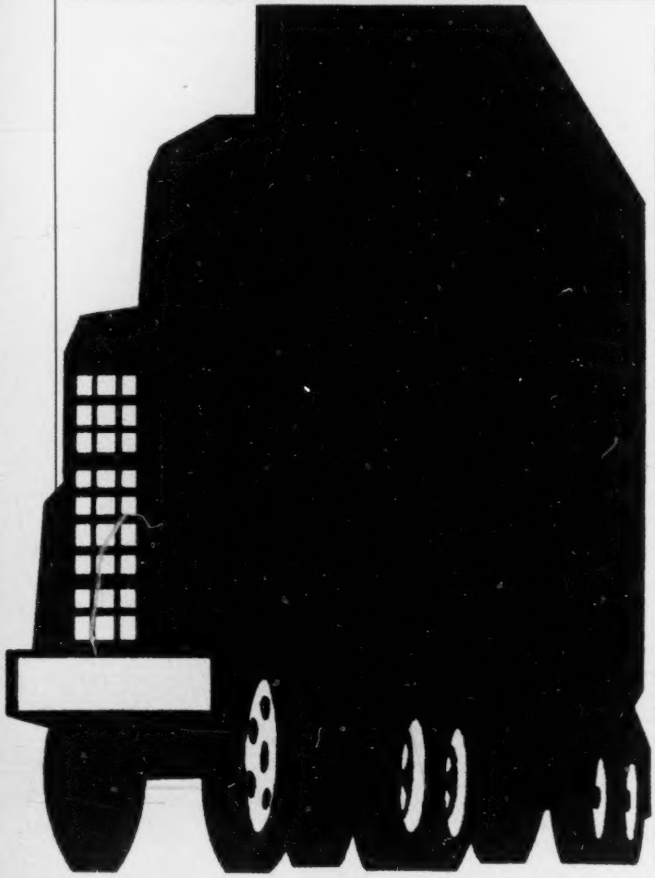
### STATE OF THE FOOD INDUSTRY

# SURVIVING A STRONG MARKET

*Food stocks in 1985 and 1986 have been stronger than ever. But stocks don't tell the whole story of what lies ahead for the food processor in a marketplace becoming more and more competitive.*



During 1985, the food industry demonstrated why it has become so attractive for investors and mergers/acquisitions specialists over the past several years – it is steady, predictable, and not prone to the kinds of cyclicality other manufacturing industries experience. Growth in '85 ran at about 1.7 percent when adjusted for inflation and at a total shipment value of $307.4 billion.

The continuing strength of the market was reflected in stock performance. For the fifth consecutive year, the companies that make up the Standard & Poor's food index outperformed the S&P 400. In fact, 1985 was the year in which the performance of the food stocks index actually passed the S&P 400 in absolute terms, as well as relative performance.

As the Standard & Poor's Industry Surveys reported: "Generally speaking, food processors have managed to forge ahead from an earnings standpoint, while averting any major disasters. Clearly, lower costs of certain raw materials have helped. But other costs also have been favorable. Declining interest rates and energy prices, along with only small increases in wage and packaging expenses, more than offset higher marketing costs in 1985. . . . Similar factors, plus the benefit of a weaker dollar (for those companies with a substantial exposure to foreign markets), should lead to an even better showing in 1986, with the food group projected to post a 19.7% EPS gain."

*Charles Haberstroh, Editor-in-Chief; Kevin Hannigan, Features Editor; Dianne Taylor, Contributing Editor; Charles Morris, Midwest Editor; Ann Przybyla, Technical Editor.*

## MERGERS/ACQUISITIONS SCORECARD, 1984-1985

| PLAYERS | 1984 | 1985 |
|---|---|---|
| **Total Activity** | 583 | 658 |
| **Selected Segments:** | | |
| **Food Processors** | 89 | 95 |
| **Diversified Firms with Food Interests** | 48 | 39 |
| **Meat Packers** | 8 | 5 |
| **Poultry Processors** | 11 | 12 |
| **Soft Drink Bottlers** | 14 | 14 |
| **Wholesalers** | 36 | 39 |
| **Dairy Processors** | 13 | 21 |
| **Packaging Suppliers** | 25 | 26 |
| **Foreign Firms Buying U.S. Firms** | 40 | 55 |

Source: The Food Institute

## NEW PRODUCT INTRODUCTIONS

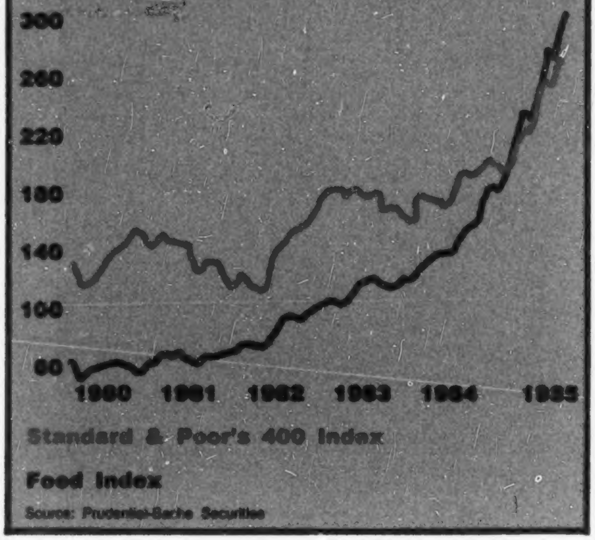
Doubled since the seventies and still going strong.

| **Average** | |
|---|---|
| **1970-81** | **1,026** |
| **1982** | **1,510** |
| **1983** | **1,803** |
| **1984** | **1,988** |
| **1985** | **2,206** |

Source: Dancer Fitzgerald Sample

## FOOD STOCK PERFORMANCE

A long, hard climb, followed by a vertical takeoff.



Source: Prudential-Bache Securities

There is little doubt that two other factors will help to keep EPS fat. For one thing, the new tax bill (if it goes into effect intact) will raise bottom lines significantly because of the large real tax rate food companies currently pay. The other factor will be divestiture, as food conglomerates begin to spin off their less stellar divisions.

Apparently, while many have their doubts about the efficacy of mega-mergers, the 1985 acquisitions of Nabisco by R.J.Reynolds, of General Foods by Philip Morris, and of Beatrice by Kohlberg Kravis Roberts & Co. did push stock prices up, having a ruboff effect on the attractiveness of food stocks generally.

But more than anything else, it was the matter that once again the food stocks proved their dependability.

If stock prices seem to bode a bright short-term future for the industry, improvement in companies' performances is still going to be largely a matter of trench warfare and very careful positioning. Per capita food consumption has been increasing very little. For example, dry grocery tonnage, as measured by Selling Areas-Marketing Inc. (SAMI), shows an average growth of less than one-half of one percent per year since 1980. Refrigerated and frozen products, generally considered one of the important growth categories over the last five years, have done better, but have been averaging only about 2.2 percent according to SAMI. True, this 2.2 percent increase has been delivering about a 7.3 percent average increase in dollars generated, largely because of the increase in upscale products which deliver more dollars per ton. But even that number is starting to taper off. Even though average dollar growth has been 7.3 percent, it went from 10 percent five years ago to 4 percent in 1985.

This doesn't mean anyone has to despair about the food

*(Continued on page 66)*

**WHOLESALE GROCERS' SALES (in billions)**

| | |
|---|---|
| 1982 | $174.7 |
| 1983 | 190.3 |
| 1984 | 208.9 |
| 1985 | 216.1 |

Source: The Food Institute

**FOOD STORE SALES (in billions)**

| | |
|---|---|
| 1982 | $245.3 |
| 1983 | 254.9 |
| 1984 | 270.4 |
| 1985 | 282.2 |

Source: The Food Institute

**GROCERY STORE PRICE INDEX (1982=100)**

| | |
|---|---|
| 1982 | 100.0 |
| 1983 | 101.5 |
| 1984 | 105.1 |
| 1985 | 107.9 |

Source: The Food Institute

**EATING & DRINKING PLACE PRICE INDEX (1982=100)**

| | |
|---|---|
| 1982 | 100.0 |
| 1983 | 104.3 |
| 1984 | 108.5 |
| 1985 | 112.6 |

Source: The Food Institute

**PRODUCER PRICE INDEX FOR FINISHED CONSUMER FOODS (1967=100)**

| | |
|---|---|
| 1982 | 259.2 |
| 1983 | 261.8 |
| 1984 | 273.3 |
| 1985 | 271.4 |

Source: Bureau of Labor Statistics

**FARM PRICE INDEX (1977=100)**

| | |
|---|---|
| 1982 | 133.2 |
| 1983 | 134.7 |
| 1984 | 141.9 |
| 1985 | 128.4 |

Source: USDA

business, but it does mean that more is going to have to be spent in market research, in developing a talent for exploring and exploiting niche markets, in regionalizing marketing, and in advertising.

For one thing, the trend toward consolidation goes on. This means that the lone food processor will increasingly be competing against companies with more resources, diversification, and market access than he possesses. The big mergers get a lot of attention, as they should, considering the fact that four conglomerates control probably 15 percent of the value of all industry shipments. But in a rush to focus on the major mergers, processors should not lose sight of the fact that for the last ten years the trend in the industry generally has been toward realignment of businesses through mergers and acquisitions. For example, between 1976 and 1985, according to The Food Institute, there were 5,680 merger and acquisition activities—an average of 568 per year. In just the food processors area, between 1980 and 1985 there were 499, or 83 per year. There are no indications that this trend will slow down.

At the same time, market share will be the name of the game. Processors cannot depend on increasing the size of the market. This will mean more expenses on the marketing side, which in turn will mean that companies not prepared to spend more on marketing will see themselves getting squeezed.

Lastly, if the 2,206 new products that Dancer Fitzgerald Sample charted as they entered the market in 1985 were an indication, there is not going to be any abatement in product technology, packaging creativity, or marketing aggressiveness. And even though new supermarket construction is showing a clear trend to more floor space and more sophisticated product selection, the competition, particularly with the introduction of direct product profitability (DPP), will only get more intense. With DPP the retailer now has a way to quantify his decision-making; so, in addition to everything else, the manufacturer will have to meet hard and fast demands for a certain numbers profile on his products.

In the face of this ever-more-difficult competition, several strategies will continue to evolve. For one thing, target and niche marketing will become more important than ever. Product differentiation and development by region, or demographic and even psychographic group will be essential. Also important will be looking for improvements in productivity. This will come partly through processors reassessing manufacturing operations; partly by choosing suppliers of machinery and ingredients who can help processors be more productive in their operations on an ongoing basis rather than just being the up front "lowest cost" supplier; and partly by continuing to make sure their businesses are carefully defined.

The market in 1986 is tougher than it was in 1985, and will be tougher in 1987. The key is to be tougher than the market—not always easy, but always necessary.

Source: U.S. Industrial Outlook 1986

## STATE OF THE FOOD INDUSTRY

# JUICES, SOFT DRINKS

There's a lot to drink in the U.S. these days. In fact, there may be too much. The flurry of new product activity in 1984 has created a glut of drinks on supermarket shelves, and many in the beverage industry expect the competition will be too tough for some brands. Bottled water, for example, is still a fast-growing beverage market with profit margins running as high as 25 percent. But the many brands now available suggest that profits may have to be shaved to buy shelf space.

In carbonated soft drink marketing, the emphasis has been on new products, discounting and heavy advertising. In some cases, as with flavored colas and chocolate-type soft drinks, the new products have become new categories. The positioning of juice-containing soft drinks such as Pepsico's *Slice*, for example, as a healthy modern beverage in several fruit-juice-containing versions – as opposed to traditional "bellywash" – prompted a horde of similar products. Now, juice-containing carbonated soft drinks account for nearly 3 percent of carbonated beverage sales and should grow to about 15 percent by 1990.

The continuing interest in dieting, fitness and health, say some industry experts, is the primary cause for the rise of the beverage industry since about 1975. The use of aspartame in new diet drinks, for instance, actually expanded the total market, bringing in new consumers who wouldn't touch carbonated beverages before that. Presumably, these "new" consumers previously drank still-drinks such as *Kool-Aid* because they could add whichever sweetener they preferred. Diet soft drinks should continue to grow over the next decade, and plateau at about 33 percent of the total carbonated drink market.

In 1985, reports Cornelius F. Kenney of the Commerce Department, Office of Consumer Goods, soft drink demand increased because of new product introductions, favorable demographics, and improved economic conditions. The value of total bottled and canned soft drink industry shipments reached about $20 billion. That's about a 3.4 percent rise in real dollars, following a 2.4 percent rise in 1984. By comparison, the carbonated soft drink industry had been relatively stagnant during the 1980-84 period.

Per capita consumption of soft drinks increased about 5.5 percent in 1985, to 43.1 gallons. But most of this increase belonged to *Pepsi-Cola* and *Coca-Cola*. There was considerable new-product activity in 1985, but the two giant cola companies drew the attention of both media and consumers via marketing moves, on-again/off-again acquisitions, and clever television commercials. Most lesser-known brands, overwhelmed by heavy advertising, lost market share in 1985 and resorted to discounting to stay alive.

Meanwhile, the total aseptic juice drink market passed the $600-million mark at retail in 1985. Current trends to increase this figure include early efforts to market aseptic packs through vending machines. Aseptically packaged drinks are tending to higher juice content, also. In fact, says one major packer, you can expect the little paper/plastic packs to go to 50 percent juice soon – followed in time by 100-percent-juice packs. His thinking? Flavored and 10-percent-juice drinks are acceptable for children, but not for adults. They're ideal, for example, as school lunchbox drinks. To capture the larger adult market, however, and put aseptically packaged juices on the family table, the industry will have to increase the juice content. In Europe, for example, where per capita consumption of single-serve aseptic packs is more than six times the U.S. average, this evolutionary process has already taken place.

**Changing Tastes for Soft Drinks**

| | Naturally Sweetened | | Non-Caloric | | Total | |
|---|---|---|---|---|---|---|
| | **1983** | **1984** | **1983** | **1984** | **1983** | **1984** |
| **Colas** | 51.2 | 53.2 | 13.9 | 16.7 | 65.1 | 69.9 |
| **Lemon-Lime** | 9.6 | 10.0 | 2.3 | 2.8 | 11.9 | 12.8 |
| **Other Flavors** | 17.6 | 12.9 | 2.8 | 1.5 | 20.4 | 14.4 |
| **Mixers** | 1.1 | 1.2 | 0.8 | 0.9 | 1.9 | 2.1 |
| **Total Market** | 79.5% | 77.3% | 19.8% | 21.9% | 99.3% | 99.2% |

SOURCE: U.S. Dept. of Commerce

That's good news for primary suppliers of apple, orange and other popular juices. But not very cheering to their customers. It may increase the pressure on juice supplies, which already has been squeezed by a recent flood of new juice-containing products. Frozen fruit juice bars, for example, are one of the fastest growing of current trends. And, along with the introduction of juice-containing carbonated soft drinks, it may create a cost/supply problem for smaller packers. Thus, it seems likely, we can expect some shakeout in the aseptic drink category.

In 1986, says Commerce Department's Kenney, the value of bottled and canned soft drink product shipments should increase about 4.5 percent, in real dollars. Demand for soft drinks is expected to continue increasing, but at a somewhat lower rate, because of promotional efforts to secure firm market share for recent new products. Drink companies are likely to continue new product development efforts and increase promotional efforts. But packaged goods discounting practices are unlikely to abate. Thus, bottlers' margins will remain strained.

Total and per capita soft drink consumption should continue to rise, but at a slowing rate, during the next five years. Some observers believe that per capita consumption will top 50 gallons by about 1990. The value of soft drink industry shipments is forecast to increase about 2.3 percent a year.

# SEAFOOD

Continuing the trend toward lighter foods, Americans in 1985 consumed a record 14.5 lbs. (net edible raw weight) per capita of seafood products, up 0.8 lbs. from an adjusted previous record of 13.7 lbs. per capita in 1984.

The National Marine Fisheries Service estimated value of U.S.-processed edible seafood at $4.7 billion—down 2 percent from 1984—while imports of edible seafood reached a record 2.8 billion lbs. (product weight) valued at $4.1 billion, up 12 percent in quantity and 9 percent in value over '84. U.S. firms exported 648.1 million lbs. of edible seafood products valued at $1 billion, an increase of 74 million lbs. and $168 million over last year.

Breakdown of U.S. production in 1985:—Raw fillets and steaks: 245.1 million lbs. valued at $436.6 million, down 7.2 million lbs. from 1984 but valued $26.2 million higher.

- Fish sticks and portions: 426.7 million lbs. worth $476.9 million, slightly up from 1984 production of 425.7 million lbs. which was valued, however, at $523.5 million.
- Breaded shrimp: 90.4 million lbs. valued at $347.9 million from 38 reporting plants, vs. 94.5 million lbs. valued at $369.4 million from 34 reporting plants last year. (Plants which report production quarterly accounted for 90 percent of 1985 production, says NFMS.)
- Canned products: 1.2 billion lbs. worth $1.4 billion, down 250 million lbs. and $185 million from 1984. Of this, 911.7 million lbs. valued at $1.3 billion was for human consumption, the balance for bait and pet food.

Breakdown of edible imports: 2.2 billion lbs. of fresh and frozen products valued at $3.5 billion; 414.4 million lbs. of canned products worth $465.8 million; 65.2 million lbs. of cured products valued at $75.1 million; 11.8 million lbs. of other products valued at $17.7 million. Just about every import category set a record: Shrimp, for example, reached a record 359.9 million lbs., accounting for 28 percent of total import value at $1.2 billion—down $63.4 million, however, from last year.

According to the NFMS report *Fisheries of the United States, 1985,* imports of analog surimi products last year amounted to 33.7 million lbs. valued at $48.2 million. Using data reported in Japanese media, however, NMFS staffers estimate 1985 imports of surimi analogs at 72.8 million lbs. Add to this 17.6 million lbs. of analogs made by U.S. producers from imported surimi and the total is 90.4 million lbs. Breakdown: Imitation crab legs from Japan, 68 million lbs.; other seafood analogs from Japan, 2.6 million lbs.; seafood analogs from South Korea, 2.2 million lbs.; analogs produced domestically from imported surimi, 17.6 million lbs. Applying the finished-product value of $1.40 per lb. used in the NFMS report would raise the 1985 value of surimi analogs to $126.5 million. Reason for the tremendous surge in analog crab legs: King crab landings plummeted from a 1980 record of 190 million lbs. to only 15.4 million lbs. last year, down 1.4 million lbs. from 1984.

## Seafood Highlights

| | 1985 | 1984 |
|---|---|---|
| Per-capita consumption: (adjusted) | 14.5 lbs. | 13.7 lbs. |
| Fresh & frozen: | 9.0 lbs. | 8.5 lbs. |
| ---Fillets & steaks | 3.24 lbs. | 2.99 lbs. |
| ---Sticks & portions | 1.76 lbs. | 1.83 lbs. |
| ---Shrimp | 1.98 lbs. | 1.90 lbs. |
| Canned: | 5.2 lbs. | 4.9 lbs. |
| ---Tuna | 3.3 lbs. | 3.2 lbs. |
| ---Salmon | 0.6 lbs. | 0.6 lbs. |
| ---Shellfish | 0.5 lbs. | 0.4 lbs. |
| ---Sardines | 0.3 lbs. | 0.2 lbs. |
| Cured | 0.3 lbs. | 0.3 lbs. |
| Farm-raised catfish | 195 million lbs | 150 million lbs. |
| Per-capita consumption | 0.4 lbs | 0.3 lbs. |
| Surimi analogs | 90.4 million lbs | 61.8 million lbs. |

Sources: NMFS, NFI, AFDF, USDA

The rate of surimi imports slowed late in 1985, however. Reasons: The fall of the dollar against the yen; limited availability of raw material to Japanese producers because of pollock quotas in U.S. fishing waters and a prohibition on fishing for pollock in Soviet waters; the FDA requirement for "imitation" labeling on surimi analogs. These factors boosted the price of raw surimi to $1.40 per lb. by mid-June, 1986.

According to Chris Mitchell of the Alaskan Fisheries Development Foundation, Alaskan production of raw surimi last year reached about 375 metric tons (825,000 lbs.) from a single plant at Kodiak, which is boosting capacity. With two more surimi plants plus a factory ship starting up this year at Dutch Harbor, Mitchell projects 1986 Alaskan surimi production at 7,000 to 8,000 metric tons (15.4 to 17.6 million lbs.).

While surimi allows low value fish to marketed in forms simulating high value products, cultured "farming" promises increased availability of high-value fish. Ecuador in 1984 shipped more than 46 million lbs. of cultured shrimp to the U.S.; cultured shrimp from the Philippines and Taiwan will soon follow. U.S. cultured shrimp is still in its infancy but the Commerce Dept. reports "about a dozen companies in five states" now active in shrimp culture. Farm raised salmon from Norway and New Zealand are making inroads. USDA reports U.S. farm raised catfish soaring 30 percent last year.

## STATE OF THE FOOD INDUSTRY

# MILK & DAIRY PRODUCTS

The year 1985 was a mixed bag (udder?) for the dairy industry. On the negative side, milk production soared to a record 143.7 billion lbs., up 6 percent over 1984 and nearly 3 percent over the previous record set in 1983. Herds grew by 1.8 percent and milk-per-cow surged 4.2 percent. At the end of 1985, USDA projected 1986 milk production to spurt 2 to 5 percent higher than last year and indeed the trend continued into the first quarter with production running 7 to 8 percent ahead of the year-earlier period in spite of support prices averaging $1.00 per cwt lower.

All of this was bad news to taxpayers: The Commodity Credit Corporation last year purchased 13.2 billion lbs. of surplus dairy products, up 4.5 billion lbs. from 1984 (but 3.6 billion below the 1983 record). CCC removals for the first two months of '86 totaled 4.4 billion lbs., well over 2.8 billion for the same period last year, and on March 1 the CCC set a new weekly record by buying 632 million lbs. of surplus products.

But the impact of the herd buyout program, enacted by Congress last December as part of the 1986 Farm Bill, started to register during the second quarter and on June 13 USDA reported that milking cows had declined by 2 percent since January 1 although yield-per-cow was up 3 percent. This prompted USDA to lower its 1986 milk forecast to only 1 percent higher than '85.

**MILK AND DAIRY PRODUCTS PER CAPITA CONSUMPTION (lbs.)**

| | 1985 | 1984 | % CHANGE |
|---|---|---|---|
| **FLUID MILK** | | | |
| Whole Milk | 116.3 | 122.7 | -5.2 |
| Lo-fat milk | 84.9 | 80.8 | +5.0 |
| Skim milk | 13.0 | 11.9 | +9.2 |
| Flavored milk/ drinks | 10.7 | 10.9 | -1.8 |
| Buttermilk | 4.3 | 4.3 | 0.0 |
| Yogurt | 3.9 | 3.6 | +8.3 |
| **MANUFACTURED PRODUCTS** | | | |
| Butter | 3.8 | 3.8 | 0.0 |
| American cheese | 9.5 | 9.7 | -2.0 |
| Cottage cheese | 4.0 | 4.1 | -2.4 |
| Other cheese | 10.1 | 9.5 | +6.3 |
| Dry whole milk | 0.4 | 0.4 | 0.0 |
| Non-fat dry milk | 1.8 | 2.0 | -10.0 |
| Evaporated/condensed milk | 7.6 | 7.5 | +1.3 |
| **FROZEN DESSERTS** | | | |
| Ice cream | 18.1 | 17.8 | +1.6 |
| Ice milk | 6.9 | 6.9 | 0.0 |
| Net milk used per capita | 53.9 | 53.5 | +0.7 |

Source: Milk Industry Foundation

On the bright side, commercial disappearance of milk in 1985 surged to a record 131 billion lbs., up 3.3 percent from 1984 and 7.7 percent from 1983, reflecting continued economic growth, more aggressive promotion, rising incomes and falling retail prices. Relative to the Consumer Price Index, retail dairy prices have fallen 13 percent since 1980 and should continue to decline slightly through 1986. "Unless the economy falters, commercial disappearance probably will increase 2 to 4 percent in 1986," said USDA in March. Sales for the first four months confirmed that prediction by running 4 percent ahead of last year.

The Commerce Department (*U.S. Industrial Outlook, 1986*) estimated total value of 1985 dairy shipments at $42.7 billion, up 4.5 percent from $40.8 billion in 1984 and 6 percent from $40.2 billion in 1983. The top four producers captured an estimated 18.3 percent of the total, down 1 percent from a year earlier. Kraft led with a 6.8 percent share, Beatrice was next with 4.6 percent, Borden third with 3.7 percent, Nestle (after its 1984 acquisition of Carnation) fourth with 3.2 percent.

Consumers continue to show concern about fats and cholesterol evidenced in declining consumption of whole milk and rising consumption of low-fat and skim milk.

Total fluid milk consumption, however, remained static at 230.2 lbs. per person, said *Industrial Outlook*. Flavored milks declined slightly, perhaps reflecting lack of acceptance of aseptic milk products. Yogurt, positioned by producers as "healthful," continues to boom. Top four producers of fluid milk products: Southland, with 6.8 percent of sales; Beatrice, 4.6 percent; Borden, 4.3 percent; Dairymen's, 3.6 percent.

Butter, after eroding in favor of margarine from 11 lbs. per capita in 1950 to 3.8 lbs. in 1984, plateaued as new butter/margarine blends became popular.

Total cheese consumption edged up as Cheddar, other American varieties and Cottage cheese dipped slightly in favor of Italian varieties, which gained 2.9 percent. Mozzarella, sparked by the booming pizza market, led with per-capita consumption rising to 4.2 lbs. from 4 lbs. a year earlier. Top cheesemakers: Kraft, with 21 percent of sales; Schreiber Foods, 5 percent; Land O'Lakes, 4 percent; Beatrice, 3 percent.

Consumption of ice cream and other dairy products has leveled off but the premium segment gained with the 1983 acquisition of Haagen-Dazs by Pillsbury and the 1985 acquisition of FrusenGladje by Kraft. Last year, four producers dominated the ice cream and frozen dessert market with 31 percent of sales: Southland, 11 percent; Kraft, 8 percent; Borden, 8 percent; Beatrice, 4 percent.

# POULTRY & MEAT

After a few years of increased consumption but stifled net earnings, poultry processors are back on the profit track. But for red meat processors, the situation is not so good. Consumption is declining, and industry economics are worsening.

Poultry consumption has risen steadily since 1979. Poultry production grew 5 percent last year and economists predict this trend will continue for the next few years. And even with these larger supplies, retail poultry prices decreased only about 1 percent in 1985—after a double-digit increase in 1984—suggesting strong consumer demand, according to USDA.

Despite this market potential, producers are only beginning to reap benefits, according to the U.S. Commerce Department. Between 1981 and 1983, average profits declined nearly 1 percent compared to previous years. Since then, feed costs declined and overall production efficiency increased substantially, and poultry industry profit margins rebounded to pre-1980 levels of 1.3-2.0 percent of total earnings.

In addition, consumer demand for poultry is increasing—keeping retail prices at 1985 levels and suggesting a strong consumer interest.

Reports USDA: poultry firms are funneling more earnings into product development and marketing. A "new-wave" of convenience chicken items has entered the market, including Tyson premium chicken entrees, sticks and chunks and "Perdue Done It!" fresh-prepared nuggets, cutlets and tenders. The $375-million further-processed poultry market, adds National Broiler Council Economist Bill Roenigk, has doubled in the last five years and now accounts for about 20 percent of the poultry industry.

Why such growth? "There is great demand for convenience foods," says a Perdue spokeswoman, "and poultry is the better buy." Economists agree: retail poultry prices are much lower than red meat prices, due to widespread production efficiency advances.

The setting for 1987? Poultry firms can look forward to large supplies and cheap feed prices, product prices in excess of production costs and a rising U.S. economy—according to USDA economists.

Beef prices should increase. The reasons:

- Herd liquidations will stop. Because of poor returns to livestock producers, and thus their need to generate cash flow, farmers "liquidated," or slaughtered, many herds in 1983-85 to receive government subsidies. This year, herd liquidations are phasing out—a factor experts predict will tighten supplies, increase beef prices and decrease producer profit margins. And economists agree: higher prices and tight supplies predictably mean decreased demand.
- Cattle feed supplies are low, a condition that causes feed prices to increase.

The total red meat price increase, however, will be a "constrained" 3-5 percent for 1986 over 1985, says USDA, since other price-altering factors—consumer purchasing power, sensitivity to relative meat prices, and tastes and preferences—are expected to remain relatively unchanged from last year.

A predicted 1.3-percent decrease in 1986 red meat supplies, however, will ultimately reduce this year's red meat consumption by at least 3 percent over 1985, says USDA. And, adds pork-producer Thorn Apple Valley: "All segments of the red meat industry continue to be bogged down with excess production capacity," one factor hurting profit margins.

Since 1984, says American Meat Institute Economist Bill Harold, red meat slaughterers have not met their traditional 1-percent of sales profit margin. In June, 1985, retailers captured 43.4 percent of the retail beef dollar—compared with 39.8 percent last year. But, predicts Harold, the longer-term future will not be so grim for red meat processors.

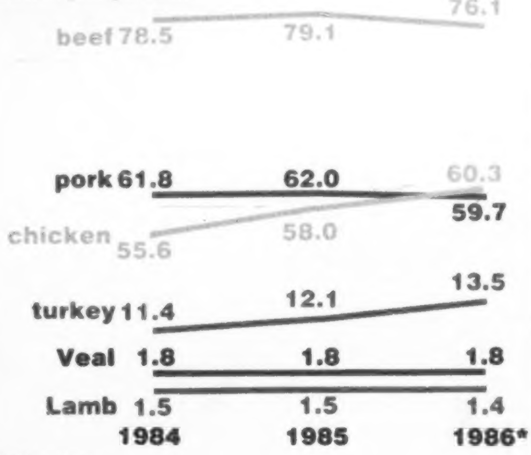
The red meat industry, he says, has adopted a new marketing orientation that should boost the bottom line: adding value through further processing. "Today you see tighter trims, and deboned and pre-cooked items in the fresh case. Red meat is not a commodity business any more," says Harold.

Swift just introduced *Lite Pork*—a product containing 25-percent less fat than comparable products. Thorn Apple Valley introduced its "lower-salt, no sugar added" pork product line, and a new "Lean 'N Trim" boneless pork product, which the firm believes "represents a growth segment."

U.S. hog inventory is at its lowest point ever, down 9 percent from last year—due to a sharp decline in hog herd liquidations. A decrease in the number of hogs available typically results in higher prices and lower profit margins for processors. Says Harold: "Hog production will increase again during the second quarter of 1987."

**MEAT AND POULTRY CONSUMPTION**

*(pounds per person)*



*Estimates

SOURCE: U.S. Department of Agriculture

# ALCOHOLIC BEVERAGES

Beer sales continued flat in 1985. According to The Beer Institute, malt-beverage production edged-up 0.1 percent to 193.3 million barrels from 193 million in 1984. Consumption (taxable removals), however, slipped 0.2 percent from 175.5 million bbls. in '84 to 175.1 million bbls. last year. Beer drinkers seem to be consuming more at home and less away from home: Packaged beer removals increased 0.5 percent to 153.4 million bbls. while draught-beer removals decreased 4.7 percent to 21.8 million bbls. Per-capita consumption of malt beverages, after reaching an all-time high 24.6 gal. in 1981, dropped to 24 gal. by 1984 and plateaued at that level last year. The U.S. Dept. of Commerce estimated 1985 value of malt-beverage shipments at $12.1 billion, down 0.4 percent from '84.

**BEER SHIPMENTS 1985**

Millions of barrels shipped, top six U.S. brewers

| Brewer | 1985 | 1984 | %Increase/ Decrease |
|---|---|---|---|
| Pabst | 9.1 | 11.8 | -23% |
| Coors | 14.7 | 13.2 | +11% |
| [redacted] | [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] | [redacted] |

Source: Business Trend Analysis

Light beers continue to gain market share, moving-up from 19.1 percent of total beer sales in '84 to 20.3 percent last year, according to Business Trend Analysts. Miller *Lite*—the top-selling light beer and the No. 2 brand (after Budweiser) among all beers—achieved higher volume in '85, and Anheuser-Busch reported that its three light beer brands surged 22 percent last year. But the American beer drinker still prefers some bite in his brew: Analysts see slow acceptance of light alcohol beers, which niched 0.3 percent of the market in '84 and remained at that level in '85. Anheuser-Busch's *LA* brand dominates this segment, too, with 70 percent of sales. Coors, Stroh and Heileman tapped a new market last year with malt coolers positioned against wine coolers. Coors learned what it needed to know, took its *Colorado Chiller* back to the drawing board after a three-month test and "remains committed to the segment," said a spokesman. Watch for it to return. Two new no alcohol "beers"—*Kaliber* from Guiness and *Barbican*, also made in the U.K. and imported by Stroh—joined several Swiss and German entries in the no alcohol segment, which surprisingly picked up 0.3 percent of the beer market in '85 and continued to grow into early '86, says David Whitman of Business Trend Analysts. In the draught segment, Miller introduced *Genuine Draft*—non-refrigerated in bottles via a "unique cold-filtration process"—to test markets in '85 and national rollout is now in progress.

**U.S. Wine Consumption**

(Millions of Gallons)

| Type | 1985 | 1984 |
|---|---|---|
| Table wines | 377.3 | 401.3 |
| Dessert wines | 34.3 | 37.7 |
| Champagnes, sparkling wines | 45.6 | 47.0 |
| Vermouth | 6.9 | 7.0 |
| Special natural wines | 26.8 | 27.2 |
| Wine coolers | 86.2 | 34.2 |
| Total | 577.1 | 554.4 |
| Per capita consumption (gal.) | 2.42 | 2.35 |

Source: The Wine Institute

Anheuser-Busch boosted its share of a flat market by another 2 percent in 1985 to 36.6 percent of U.S. beer sales—"40-percent market share by the late 1980s," said Chairman August A. Busch III. At the same time, Coors scored a remarkable 11 percent gain in shipments in 1985 through geographic market expansion and increases in California and Texas.

According to The Wine Institute, per-capita wine consumption grew 3.4 percent last year. As shown above, however, the gain was entirely due to wine coolers— which surged 155 percent to 86.2 million gal. from 34.2 million gal. a year earlier—while consumption of wine per se declined in every category. Consumption of American wines grew 2 percent at the expense of imports, which fell 2 percent. California wines entering distribution in 1985 were up 0.7 percent; wines from other states gained 1.3 percent.

According to the Distilled Spirits Council of the U.S. (DISCUS), consumption of distilled spirits—after peaking in 1981 at 450 million gal.—declined for the third consecutive year to 426.1 gal. in 1984 and the slide continued into '85. Per-capita consumption steadily declined from a high of 2.88 gal. in 1974 to 2.46 gal. in 1984, down 1.3 percent from '83. Higher federal and local "sin" taxes contributed to the decline. Whiskey sales fell 5 percent in '84 from a year earlier, with domestic down 8 percent and imports by 2.2 percent. Even blended whiskies dropped, but in line with the trend toward lighter drinking the decline slowed to 0.5 percent. Among imports, only Canadian whiskey gained (4 percent) while Scotch fell 9 percent. Vodka and gin, both domestic and imported, also declined. One bright spot: Cordials rose 12 percent, with domestic up 15.1 percent and imports up 7 percent. Distillers, too, hope to boost sales by riding the cooler wave. One example: *Schnapps Spritz*, a fruit-flavored 5.5-percent alcohol beverage from Fletcher & Oakes.

# BREAKFAST CEREALS

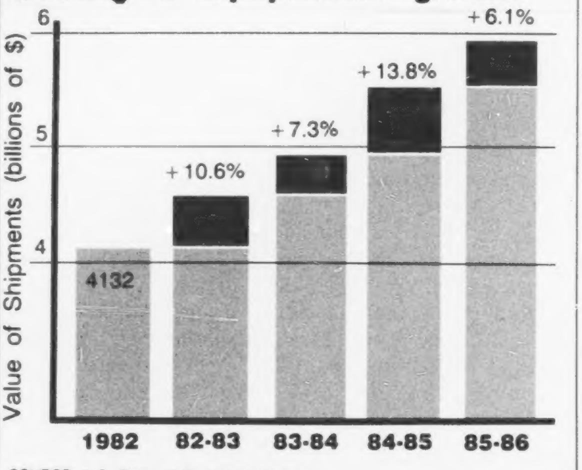
Breakfast cereal manufacturers can see the dawn of a new marketing era. After the turmoil of the past 10 years, the industry seems to have nothing ahead but smooth, steady growth.

Consider: Most cereal manufacturers have changed their products' image from one of sugar-laden, tooth-rotting junk to one of healthy, natural, nutritious food products. Many new cereals are enriched with fiber, sweetened with aspartame and/or contain real fruit. And even sugar-containing cereals contain less sugar than before.

The public has responded to this effort by buying more cereal than ever before. Other consumer trends may have helped, though. The growing interest in fresh fruits, for example, which are eaten with many cereals, and the turn away from high-fat and high-cholesterol products such as bacon and eggs, may have affected the type of breakfast being eaten today.

Whatever the reasons, the cereal market looks strong and should stay that way. What it all adds up to is a growth market for manufacturers who can adapt quickly to changing consumer tastes.

**Breakfast Cereal Market Continues Strong . . . despite leveling off in population growth**



SOURCE: U.S. Dept. of Commerce estimate

In 1985, estimates Commerce Department's William V. Janis, Office of Consumer Goods, about 1.8 percent—or $5.6 billion—of all food shipments were cereal breakfast foods. And the industry's real gain in shipments, about 8.2 percent, was the largest since 1973. There were several reasons for this gain, Janis says. Most production costs either declined or rose only slightly, for instance, helping to hold producer prices down. And, of the eight principal ingredients used in producing breakfast cereals, only flour and prepared flour mixes recorded a slight rise in 1985.

On average, retail prices for all breakfast cereals increased about 5.5 percent in 1985—the same change as in 1984—while prices of all food rose 2.9 percent. Producer prices for corn meal, grits, and hominy fell 4.4 percent, while prices of all other hot cereal gained 2.6 percent. That may reflect a change in regional tastes, toward conformity with national preferences. Producer prices for cold cereals, the major breakfast cereal segment, rose 5.5 percent over 1984.

Recently published Bureau of Census data show that many consumers have gradually changed their breakfast food preferences. While total per capita consumption of cereals rose about 2.9 percent in 1985, to 14 pounds, that growth varied by type of cereal. Cold cereal, for example, gained 2.1 percent, reaching 9.8 pounds per capita, while corn- and wheat-based ready-to-serve products both advanced 3 percent, to 3.3 pounds per capita. Meanwhile, oat- and rice-containing cereals were static at 1.6 and 1.2 pounds, respectively. Hot cereals fared slightly better, up 3.3 percent in per capita consumption, to 3.1 pounds. Consumption of farina and other wheat breakfast food moved up 20 percent, to 0.6 pounds per capita, while oatmeal remained unchanged at 2.5 pounds.

In 1986, breakfast cereal shipments should increase 3.5 percent—although mid-year data from SAMI indicates this estimate may be too modest. Stable ingredient costs will help to hold down increases in consumer prices. Per person consumption of all breakfast cereal will probably rise 3.1 percent in 1986, with consumption of all cold cereal matching that increase and corn-based cold cereals remaining unchanged. Per person consumption of wheat, rice, and oat cereals should rise 2.9 percent, 7.7 percent and 5.9 percent, respectively. By comparison, consumption of hot cereals should gain 3.2 percent.

During 1985-1990, says the Commerce Department, the value of breakfast cereal shipments should expand 2.5 percent annually, while total population will increase 0.9 percent per year. Estimated per capita consumption of all breakfast cereal will gain 2.3 percent per year. And, since demand will grow slowly while consumer tastes and purchasing patterns are changing rapidly, we can expect a steady flow of new products to keep pace with changing tastes.

Sales of presweetened cereal should increase as the number of children aged 5-14 grows at a rate of 1.6 percent a year. The use of nonsugar sweeteners will probably increase, too. From 1985 to 1990, the population aged 20-49 should continue to prefer unsweetened cold cereal. Firms also are expected to incorporate more fruits and nuts into their products.

Demand for hot cereal also may increase. Children aged 5 and under and persons aged 65 and over, the main consumers of hot cereal, will likely contribute to an estimated 2.4 percent yearly increase in per capita consumption of hot cereal. Although the population of children aged 5 and less will rise only 0.5 percent annually, the affluent elderly will gain in numbers by about 2 percent a year.

# CANNED FOODS

Sales of canned food (or food preserved by heat processing) began to increase in 1985 after being sluggish for the past few years. The increase was not a dramatic one, though. Canned speciality foods were among the items showing the largest sales gain. Aseptic packing has also boosted sales of canned foods.

"The value of production of canned fruits, vegetables, and specialties rose to an estimated $22.4 billion in 1985," according to *U.S. Industrial Outlook 1986.* After adjusting for price changes this reveals a 2.2 percent production increase which is the first meaningful increase since 1978.

The Outlook went on to point out that most of the real growth was attributable to increased demand for aseptically packaged foods, sauces, and ethnic foods. "Consumer demand for most canned goods remained sluggish; shoppers apparently prefer fresh and frozen goods," continu~~ed the report~~. Canned single serving soups, and canned foods with low sodium or sugar content also are doing well.

But customer demand is not the only factor, much of the flux in canned fruit and vegetable production can be attributed to availability of crops in any given year. For example, the decline in processed vegetables between 1984 and 1985 is largely attributable to an 8 percent reduction in annual tomato acreage, Shannon R. Hamm, Agricultural Economist pointed out at the Annual Agricultural Outlook Conference, last December in Washington D.C.

On the other hand, the other three major processing vegetables—sweet corn, green peas, and snap beans—are up an average of 7 percent. This is translating into larger 1985/86 packs of these vegetables, while domestic tomato pack will be reduced. Imports of processed tomatoes will partially offset reductions in domestic supply.

"The important issues for vegetable producers become: (1) the future growth in demand for vegetables, and (2) the continuing response of imports to the strong relative dollar in competing nations," Hamm concluded.

In the area of canned fruits, the increasing popularity of fresh fruit as a popular snacking item has contributed to the sluggish sales. Although wholesale prices of most canned fruit were higher at the beginning of 1986 than a year previously, prices could be reduced to stimulate sales.

Commodity items are not the only type of canned foods showing sluggish growth, another area of canned foods with low growth is soup where growth has been just 2 percent a year since 1983, reports Outlook. The real growth for soup has been in the dry mix area which is growing at 14 percent a year.

Campbell Soup Co., the country's leading canned soup producer, now offers dry and frozen soup lines. The company did boost its 1985 canned soup sales with several new product introductions. The new *Gold Label* line of *Creamy Natural Soups* was rolled out nationally in 1985, and the *Home Style Soup* line was expanded during the same year.

**Canned Foods**

Pounds (in millions)

| 1982 | 1983 | 1984 | 1985 | |
|---|---|---|---|---|
| 988 | 989 | 964 | 940 | Pork & Beans |
| 532 | 526 | 535 | 527 | Pasta |
| 234 | 244 | 240 | 240 | Chili |
| 105 | 118 | 127 | 129 | Beef Stew |

Information provided by Selling Areas Marketing, Inc. (SAMI)

Cases (in millions)

| 1982 | 1983 | 1984 | 1985 | |
|---|---|---|---|---|
| 59.5 | 50.1 | 56.2 | 55.2 | Golden Corn |
| 33.1 | 29.1 | 32.6 | 32.5 | Tomatoes |
| 20.5 | 20.6 | 23.3 | 29.1 | Peas |
| 2.4 | 2.3 | 2.6 | 2.8 | Asparagus |
| 0.9 | 1.0 | 1.1 | 1.3 | Peaches |

Information provided by the National Food Processors Association.

Sales of canned pasta, pork & beans, chili, and beef stew have not shown any significant changes over the past four years. Chesebrough-Ponds Inc. is hoping that its 1985 introduction of *Ragú Pasta Meal* in glass jars will contribute to sales growth in 1986.

One method used by the canned food industry to battle sluggish sales has been to establish a marketing program. It is sponsored by the industry under the canned Food Information Council, and marks the first time that various segments of the industry have joined together to communicate positive information about canned products. The program recently launched its third year with a $2 million advertising and public relations effort.

"Our goal is to reach the consumer with an integrated advertising and public relations message that canned foods are high quality, convenience products that meet the needs of contemporary consumers," said John Porter, Vice President of Dole Processed Foods Company and Chairman of the Canned Food Marketing Committee.

### STATE OF THE FOOD INDUSTRY

# FROZEN FOODS

The increasing number of women in the work force continues to be a major driving force behind accelerating frozen food sales. But a close examination of frozen food sales during late 1985 and early 1986 reveals changes in the buying patterns established several years ago.

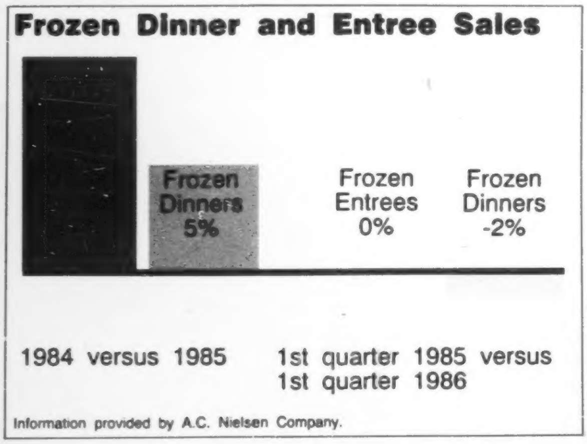
The market for frozen entrees, which exploded in 1982 when Stouffer Foods' *Lean Cuisine* captured $125 million in sales during its first year in national distribution, is no longer sustaining double digit increases. Tracking of frozen entree sales by A.C. Nielsen reveals a slowing of growth beginning in late 1985 and early 1986. Frozen entree sales for December 1984 through November 1985 reached $2.4 billion—or a 17 percent increase over the previous year, reports Nielsen. But sales for the first quarter of 1986 (December 1985 through March 1986) are even with sales for the same time period one year earlier.

Frozen dinners sales are also slowing. Reaching $1.2 billion in sales during 1985, or 5 percent growth from a year previously, frozen dinner sales registered a -2 percent growth for the first quarter of 1986.

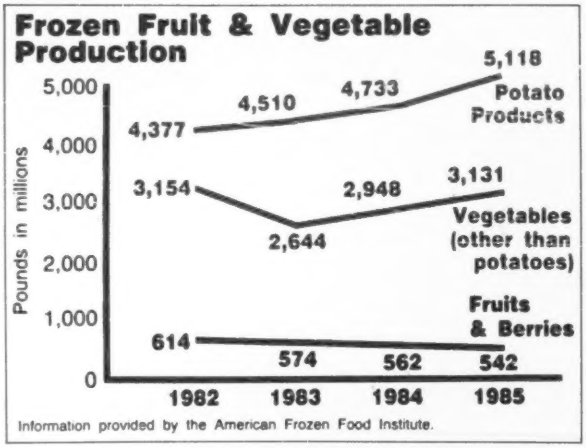
This shakeout was expected, although the exact timing was not known. "One possible problem which could arise is in terms of freezer space at retail food outlets...The limited space, coupled with a glut of new entries into the market, should bring about a shakeout in the near future," predicted Business Trend Analysts, Inc. (BTA) in its report, *The Market for Frozen Dinners and Entrees*.

This is not to say that frozen dinner and entree sales will not continue to rise, but the rise will not be as rapid as in the past. Many of the reasons for the popularity of these items still exist. In particular, time constraints which have made frozen meals coupled with microwave ovens an increasingly popular phenomenon, will continue to be a driving force as the number of women in the work force grows.

"People have displayed a willingness to pay good money to make food preparation as painless as possible," states the BTA report. This is also seen by looking at microwave ovens usage. Microwave ovens are in use in 40 percent of the U.S. households, with an expected increase to 75 percent by the turn of the century, predicts Business Communications Co., Inc.


**Frozen Dinner and Entree Sales**

Information provided by A.C. Nielsen Company.


**Frozen Fruit & Vegetable Production**

Information provided by the American Frozen Food Institute.

While frozen entree and dinner sales are no longer increasing at double digit rates, frozen breakfast sales are. Introduced in many cases to compete with fast food chain items, frozen breakfast entree sales for 1985 were up 29 percent from 1984 according to Selling-Areas Marketing, Inc. (SAMI). Frozen breakfast entree include french toast, pancakes, quiche, and toaster items.

The excitement in frozen food sales is clearly in further processed, value added foods rather than in commodity items like various fruits and vegetables. But these items do play an important role in the frozen food industry. For example, today American are eating about 11 pounds of frozen vegetables per person per year—up from 9.6 pounds in 1970, according to the October 1985 issue of FDA Consumer. Although approximately 30 different vegetables are available, still corn, broccoli, peas, and snap beans account for half of the total consumption. In contrast to increased frozen vegetable consumption, frozen fruit consumption has declined steadily.

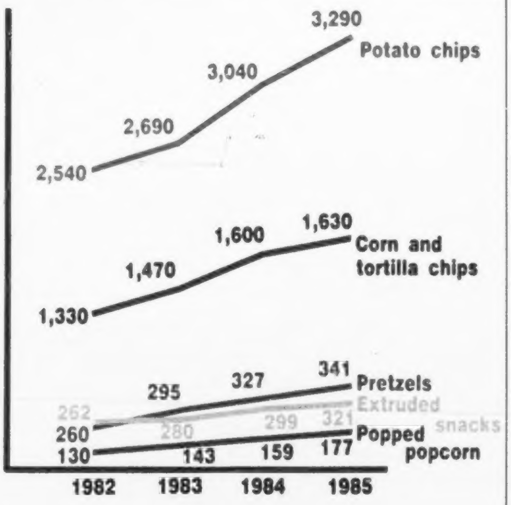
And consumption of frozen potatoes has jumped more than fourfold over the past two decades, reports the FDA Consumer. This is mainly due to the increased use of frozen French fries, hash browns, and other frozen potato products in food service outlets.

Frozen French fries are the most popular frozen potato item. They accounted for 4,384 million pounds of the 5,118 million pounds of frozen potato sales in 1985, according to the American Frozen Food Institute. And, of the 4,384 million pounds of frozen French fries sold in 1985, 3,907 million pounds were sold to food service establishments.

The overall frozen food market should continue to grow—especially since expected growth of one- and two-person households, and number of women in the work force are expected to grow.

## *STATE OF THE FOOD INDUSTRY*

# SNACK FOODS



**Snack Foods** Sales Volume (in million dollars)

Information provided by Potato Chip/Snack Food Association.

Snack food sales – including potato chips – are rising despite the emphasis on good health and nutrition. In fact, potato chips showed an 8.2 percent increase in sales from 1984 to 1986 which was second only to popped popcorn in the salty snack area.

Greg Overman of Frito-Lay gives several reasons for potato chips' popularity. "People's eating habits have changed. Fewer families sit down to meals, leading to more grazing or eating on the run, and potato chips offer consumers convenience."

A new study by MRCA Information Services, Stamford, CN, confirms that eating habits are changing. Between 1977 and 1985, the number of people eating lunch at home dropped 18 percent from 51 million to 42 million. The study pointed out that this occurred despite a growth in population. Many of these lunch skippers are likely to eat some type of snack during the day.

As consumers continue to eat smaller, more frequent meals and supplement their diet with snacks, potato chip consumption is expected to continue its climb. Business Trend Analysts predicts that the "chip" industry will grow at a compound annual rate of 9 percent through 1990.

Frito-Lay's Overman credits new product introductions for part of the growth within the potato chip category. While regular chips represent about 78 percent of total potato chip dollar sales, flavored chips represent the highest growth segment. No-salt potato chips have found a small niche with 5 percent of chip sales.

Pricing strategy is critically important to the success of the snack food industry, according to Frost & Sullivan. This is because snacks do best when prices of snacks rise less than other consumer goods. F&S predicts that the overall salted snack food industry will see moderate growth, and that product category growth will depend on development of new products, pricing strategies, and overall demographic and economic trends.

In the area of warehoused canister snacks, Pringles is the category leader with 50 percent market share. This segment of snack foods represents about $295 million a year in sales. Shoestring potatoes account for $40 million or about 14 percent.

Pretzel sales only increased 4.3 percent in sales from 1984 to 1985. But dieters ate 59 percent more pretzels in 1984 than in the early 1980s, according to a Menu Census study. The study by MRCA Information Services compared eating behavior of dieters and non-dieters, both at home and away from home. Pretzels are baked in an oven rather the fried in oil like chips and extruded snacks, and this may account for their appeal to dieters.

Health consciousness is having its effect on the snack food industry, though. Many people are turning to "natural" snacks. But these sales are in addition to salty snack sales rather than detracting from them. For example, Americans spent $600 million on fruit snacks alone in 1985, reports Del Monte.

"Del Monte has long been a leader in the production of dried fruit – traditionally used seasonally, mostly as an ingredient in cooking," said Ted Taft, a marketing director at Del Monte USA. "We've taken that product, added convenient packaging and variety, and produced a high quality snack that fits with a modern lifestyle."

Del Monte USA first introduced Fruit Snacks a year ago in two varieties – fruit mix and yogurt covered raisins. Six varieties including Sierra Trail Mix, Pineapple Nuggets, Tropical Fruit Mix, and Strawberry Yogurt Covered Raisins are now available.

"The instant popularity of fruit snacks snack category points to a growing demand on the part of the public for nutritional and convenient snacks that deliver taste and variety," Taft added.

Raisins have always been a popular fruit snack. And they continue to be, even though the Food Institute Report quoted trade estimates for California raisin production at 300,000 tons this year, down from 360,000 tons last year.

Sun Diamond Growers, a co-op comprised of walnut, raisin, prune, fig, and hazelnut growers, reports that the tonnage of products sold in 1985 was the highest ever, yet sales revenue and net proceeds were the lowest ever. Lower priced foreign imports are the main reason for this. Sun Diamond did recently receive a concession from the union which reduced base pay and fringe benefits of the workers by 35 percent, though. In addition, the company plans on focusing more on value-added products which contain its basic commodities and are sold under its own brands.

# BAKERY PRODUCTS

For a market that grew only .5 percent in 1985, the situation for bakers is surprisingly good.

U.S. Department of Commerce economists predict industry growth will pick up to about 1.5 percent yearly into 1990.

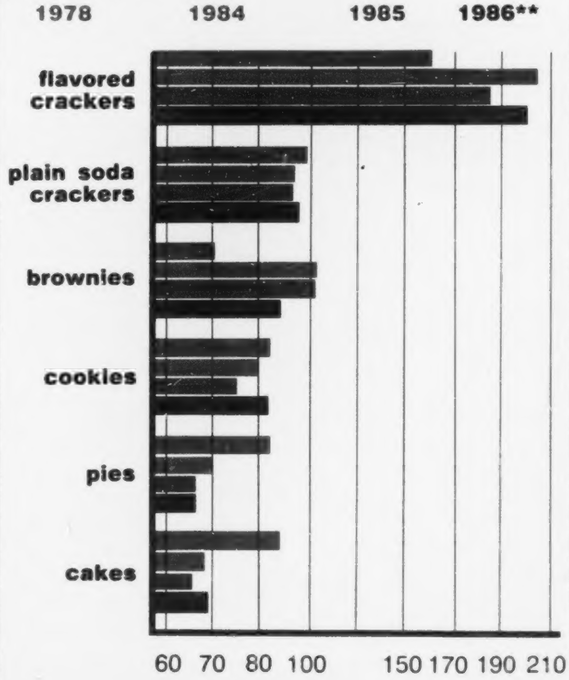
Raw material costs have been stable since early 1985 and will remain so for 1986, predicts American Bakers Association President Bob Wager. A 1985 ABA survey concluded that these stable prices helped to increase bread bakers' pretax profits by 4.6 percent on a single one-pound loaf—their largest profit margin since 1977. In fact, in 1985, prices for nine out of ten principal baking ingredients declined or remained stable, says the U.S. Department of Commerce. Only shortening edged up 1.5 percent over 1984.

Certain segments within the bakery market, too, show much promise for growth: variety breads, specialty items, soft cookies, and refrigerated/frozens.

In the $5.4-billion dark-bread industry, per capita consumption rose 5.9 percent annually between 1977 and 1984; in 1985, consumption rose 1.1 percent to 8.9 pounds per person. Rye and pumpernickel bread consumption has been level for two years.

According to a Ph. Orth Company baking industry survey conducted at the 1985 International Baking Industry Expo, 74 percent of those surveyed feel variety bread sales will continue to grow. Respondents also felt that "new lines will be added" to the variety bread category, and that whole or multi-grain breads hold the most potential to grow in sales.

**IN-HOME BAKED GOODS CONSUMPTION INDEX**
(100 index = 1973)



*This study estimates eating habits of the U.S. population. To obtain this data, MRCA Information Services studied a 5,500-person representative sample of the U.S. Census.
**Calendar years April through March
SOURCE: MRCA Information Services

Ph. Orth survey respondents also strongly agreed: specialty items (muffins, biscuits, cookies and croissants) have the "greatest demand for new product development and the highest potential for bakery sales." Fifty percent think the croissant, in particular, will enjoy continued sales growth.

The cookie market, too, is growing. In 1985, shipments in the $3-billion cookie market advanced 4.4 percent, according to the Commerce Department. Frost & Sullivan predicts the cookie category will grow about 2 percent per year in volume into 1990.

Soft cookies seem to be faring best. According to the Commerce Department, soft cookie introductions have cannibalized the sandwich cookie segment. Sandwich cookies, which held 31 percent of the cookie market in 1977, how hold about 26 percent. Other cookie types—including soft cookies—held 65 percent in 1977 and now comprise 70 percent.

Industry sources estimate 1985 shipments of refrigerated and frozen bakery products sold directly to consumers totaled $1.6 billion. Commerce Department analysts say this area holds "enormous potential" for food firms. Many top food firms agree. Pillsbury recently introduced its *Crusty Loaf* refrigerated bread dough, a product that capitalizes on the frozen 'convenience' trend. Sara Lee, as well, recently introduced its own frozen bagels to compete with Dart & Kraft's newly-acquired Lender's frozen bagels.

Within the stagnant cracker segment, flavored crackers show the most promise. "Crackers are preferred by adults, and the adult market is growing steadily," says Frost & Sullivan. The firm predicts crackers will score an annual growth rate of about 1.6 percent through 1990, to reach a retail value of about $2.2 billion (in 1984 dollars).

White bread and rolls, which comprise 31 percent of the bakery category, have been losing market share since 1977. Consumption in 1985 decreased 1.8 percent over 1984 to total 26.8 pounds/person. Analysts predict these decreases will slow as the white-bread-eating, over-65 population grows. They are expected to increase 2.1 percent annually. Industry representatives believe, however, that variety breads will continue to be favored over white.

For sweet goods consumed at home, the picture looks dim. Says MRCA Information Services, a research firm: "For dessert, Americans ate 1.9-billion fewer cakes and pies in the last seven years." The number of cakes eaten in one MRCA census study decreased by one-third since 1973. Pies, too, are down substantially. The only gain: individually-wrapped sweet goods, which grew just moderately.

### STATE OF THE FOOD INDUSTRY

# CONFECTIONS & DESSERTS

In the confectionery and desserts category, "premium" is where the action is.

For candy makers, this news is both good and bad.

*The Bad:* Competition from foreign manufacturers is heavy. Since 1982, confectionery imports have risen dramatically. In 1985 alone, U.S. candymakers' share of the domestic market declined about 2 percent, according to the U.S. Department of Commerce. Specifically, the U.S. share of domestic chocolate consumption reportedly declined less than 1 percent while the U.S. share of the nonchocolate market dropped about 3 points.

The value of all candy imports reached an estimated $325 million in 1985, increasing 28 percent from 1984. The reason for this foreign success? After 1982, the dollar appreciated substantially and the U.S. restricted sugar imports—two factors that opened the door for foreign candy makers to undercut domestic manufacturers.

*The Good:* But since March, 1985, the value of the dollar has been declining. The drop came too late to affect the first half of 1986, but not the second. Retail prices of confectionery imports are now on the rise.

"We expect price increases of imported chocolates to force a leveling off in growth in the super-premium market, which now constitutes 5 percent of the total market for chocolate confections . . . smaller American manufacturers may be able to seize this opportunity to establish themselves in the premium market," says Godiva Chocolatier President Tom Fey.

"Premium" chocolates represent the greatest growth area in the entire $7.1-billion confection industry right now, thanks mostly to an increase in 35- to 54-year-olds, and disposable income. In 1984, the boxed chocolate category (the chocolate segment comprises 65 percent of the entire confection industry) was worth $1.8-billion, and, says research firm Frost & Sullivan, this figure will double by 1990.

The market for highly-expensive, "super-premium" chocolates, however, "seems to be reaching maturity," according to Find/SVP. But, analysts agree, medium-priced boxed chocolates, or just plain "premium" items, will really grow. By 1993, almost one-half of all boxed chocolate consumption will be in the middle-priced segments, according to Find/SVP.

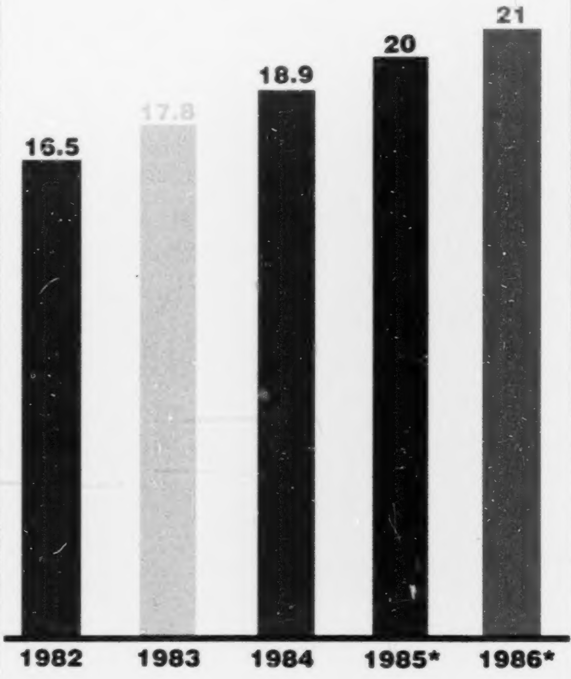
On another note, the $1.5-billion chewing gum market showed "uncharacteristically weak" sales in 1985, according to Warner-Lambert. Sugarless gum, however, is by far the fastest-growing segment, thanks to a proliferation of gums containing aspartame. Says Frost & Sullivan: the sugarless gum segment grew 25-percent last year.

For the many candy producers purchasing sugar, however, prices should remain relatively stable for 1986. At this writing, bulk sugar prices checked in at 23½ cents per pound, and no sharp price increases are expected soon, according to Eiler Ravnholt, Hawaiian Sugar Planters Assn. Predicts Ravnholt: Prices will go up another "½-cent or so."

As in confectionery, the buzzword in the frozen novelty business is "premium."

Frozen novelty producers are enjoying a growing $150-million retail market that is expected to double by 1990, thanks to a proliferation of premium, frozen fruit bars, says Find/SVP. Premium frozen novelties, adds the research firm, are expected to cannibalize the non-premium novelty segment.

**CANDY CONSUMPTION**
*(pounds per person)*



*Estimates
SOURCE: Godiva Chocolatier and U.S. Dept. of Commerce

According to A.C. Nielsen Co., the entire frozen novelty market grew 14 percent in 1985 over 1984. MRCA Information Services found, too, that the 5,500 individuals they track substantially increased their consumption of in-home frozen novelties. In this study, the 5,500 people are representative of the U.S. census. "The past few years have seen the entrance of large, well-financed food firms into the frozen snack business," comments the Eskimo Pie Corporation. "And we expect this intense competition to continue in the forseeable future."

Recently, Jell-O embarked on a "shrewd" marketing course and introduced its own fruit bars and gelatin pops—after the extremely successful introduction of its pudding pops some years ago.

# DRESSINGS & SAUCES

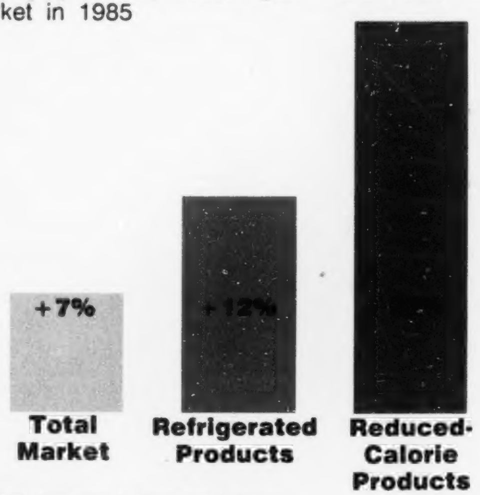
What had been just a product category has grown up. As salad manufacturing is now an industry, so is the production of salad dressings and sauces. And it's a booming industry.

According to The Association for Dressings and Sauces in Atlanta, total 1985 production of dressings and sauces increased 62 percent over 1975 figures to an estimated 445.2 million gallons—about 45 percent of it mayonnaise, 25 percent salad dressing and 30 percent other products. Estimated dollar sales for salad dressing products in 1985 were set at more than $2.6 billion. Forty-five percent of those sales were retail, 55 percent were foodservice.

What's more, the future looks as bright as the present for this new industry. "Fresh vegetable consumption is expected to increase 35 percent by the year 2000," says Larry Noble, President of T. Marzetti Company and Board Chairman of the Association for Dressings and Sauces. "Fresh fruit consumption will rise 23 percent. And, as all sorts of salads continue to surge in popularity, so will salad dressings."

**Sauces, Dressings on Rise**

Reduced-calorie products grew faster than total market in 1985



SOURCE: Association for Dressings & Sauces

Noble points out that "Consumers now accept that a salad can be hot or cold, served as an appetizer, entree, side dish or dessert. In effect, salad time is any time." Salads are on almost every menu, he says, whether at home or away from home, in outlets from fast food to white tablecloth. "And there's a dressing right there beside every one served."

The most recent figures available support this view. Per capita consumption of salad dressings has increased 48 percent since 1975. Last year, on average, we each consumed 14.9 pints of salad dressing—up from 10.1 pints in 1975. And a lot of that increase was new types of dressings.

For example, 12-week data from Selling Areas-Marketing Inc. in early 1986 showed that low-calorie salad dressings tonnage gained 23 percent, while refrigerated salad dressings and sauces rose 12 percent in the same period. The category as a whole increased about 7 percent—or over 25 million gallons.

Those figures are backed up by many consumer research studies. A *Better Homes and Gardens* survey, for example, found that 82 percent more consumers are more calorie/weight conscious today. And 53 percent are eating more salads. A Gallup poll conducted for *American Health* reports a trend toward vegetarianism, and a survey by Vance Research Services shows that nearly one-third of surveyed households said they ate more fresh vegetables than they had the year before. Salad bars are popular with 60 percent of restaurant patrons, says another Gallup poll, especially the self-service feature. Also, says the Brown Bag Institute, salads (pasta, fruit or green) are very popular among brown-baggers today.

Foodservice sales are sharing the strong action. A 1984 study by the National Restaurant Association found main dish salads were the sixth fastest growing menu item with 31 percent more restaurant patrons ordering them in 1984 than in 1982.

French, Thousand Island, Italian, Blue Cheese and Oil & Vinegar, respectively, remained the most popular non-diet menu dressings in 1985. Sweet & Sour and low-calorie dressings led the pack in terms of growth as a popular menu item followed by buttermilk-based, Caesar and Creamy Garlic.

Eating trends uncovered by these and other studies included an increased interest in nutritious foods, shifts to more roughage, less consumption of cholesterol, and a marked increase in "grazing." Salads and flavorful dressings supply the "natural" solution to these consumer concerns and desires.

In response to this growing interest in "fresh" foods, many manufacturers have introduced refrigerated dressing lines that are as fresh as the salads. In keeping with the low-cal craze, "light" versions of refrigerated lines are being introduced. And, prompted by the continuing popularity of bleu cheese dressing, many manufacturers have new cheese dressings on the market, such as Creamy Parmesan, Italian with Cheese, and Romano, etc. Buttermilk-based products are also moving up strongly in this category.

Condiment manufacturers are making strong advances into the gourmet/specialty foods market also. Whole seed and flavored mustards, flavored mayonnaise and oils such as barbecue basters and dressings positioned as dips and marinades are finding their way onto gourmet shelves and into specialty shops.

"Right now," sums up Noble, "dressing manufacturers are meeting consumer needs by introducing new category segments such as reduced-calorie, refrigerated and more cheese flavors. And, with new packaging techniques such as the squeezable plastic bottle, how can our industry do anything but prosper?"

Insert 51 or see FEM, p. 380 →

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# Chilton's Food Engineering

PACKAGING
ALLENGE
E6A20

## MORE THAN A CONTAINER

*Today's food package long ago ceased to be just an envelope for its product. It is part of the entire marketing dimension of what's inside, and as such has very complex demands made on it.*

## WHAT'S COOKING

*Customizing heat exchange systems.*

## PACK EXPO 86

*A preview of this major show in November.*

# Chilton's Food Engineering

**COVER STORY**

This survey of *Food Engineering's* Executive Advisory Board reveals their opinions about current trends and factors that affect packaging buying patterns.

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**FOOD ENGINEERING®** (ISSN 0193-323X) September 1986, Vol. 58, No. 9. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office © Chilton Company, 1986. All rights reserved.

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Fermented from an entirely different culture, Kefir has less bite than yogurt but a similar appearance.

**60 Fish-Plus**
This product, by creating a hostile environment for bacteria, extends the shelf life of fresh life.

**63 Tapioca Dextrin**
Now you can increase volume in pudding mix without adding a lot of calories.

**66 Sweeteners**
A new processing technology will allow the introduction of crystalline fructose sweeteners at 35 to 60 cents a pound.

**69 Muesli Bar**
Conceptual granola bar incorporates walnuts for nutrition and functionality.

**72 Literature**

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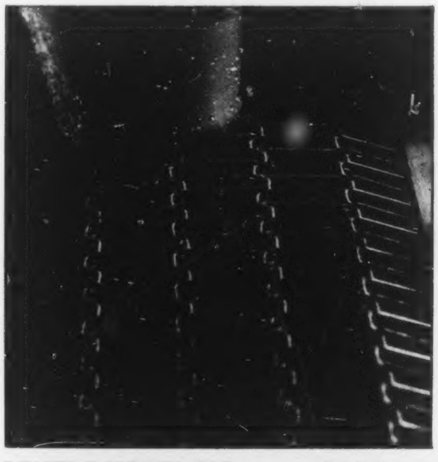


**GENTLE HANDLING:** **PAGE 102**

*Special Emphasis*

**COOKING & HEAT EXCHANGE:**
This month's special coverage details how aseptic processing systems are being custom-engineered to product characteristics, using new ideas in heat exchange and total system design.

**Pages 92 to 99**

# Eating trends mean changes to food industry

Gordon McGovern of Campbell Soup likes to tell the story of dinnertime when he was a child. It was always at the same time – 5:30 p.m. – and was always a sit-down meal with the entire family eating together and discussing what had gone on in their lives that day. McGovern also likes to compare that picture with his family today – he tells the tale of the constantly-revolving refrigerator door as his children eat on the run.

## Eating trends have changed

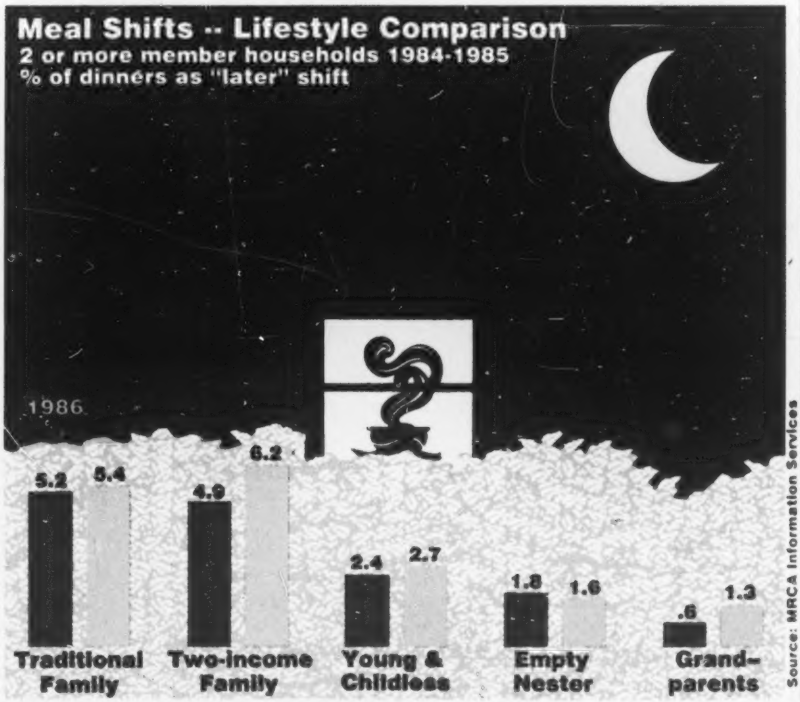
The picture set forth by McGovern of present-day family eating habits is all too commonplace across the U.S. A recent study by MRCA, the *Dinner Study*, surveyed 5,500 individuals from 2,000 representative households across the country. The study showed that when Americans are eating at home they are not necessarily dining together. Changes in lifestyles have wrought vast changes in eating habits. More and more households (10 percent more than seven years ago) are eating dinners in shifts rather than together. The home-cooked "family dinner" is like a black and white television – it's becoming a thing of the past.

Households with children are 50 percent more likely to have second or third shift meals than a household without children, says the study. Two income households are 15 percent more likely than traditional households (with one income, two parents) to serve second and third shift meals.

These second and third shift meals are being consumed mostly by people ranging in age from 18 to 34 years of age – and they are very often meals that have been reheated in the increasingly popular microwave oven. (The Commerce Dept. estimates that 51 percent of the U.S.'s 85 million households now have a microwave. The popularity of the microwave continues to grow.)

## Who is eating what

The Dinner Study cites the following statistics:



Source: MRCA Information Services

Eating in shifts has become a growing U.S. phenomena. Households most likely to have second and third shift diners are those with children (twice as likely) or two-income households (15 percent more likely).

- 89 percent of first-shift diners eat the "main dish"; 82 percent of the second and third shift eaters will do so.
- Vegetables are eaten by 41 percent of first shifters, later shifters eat vegetables only 30 percent of the time.
- Dessert is eaten by 23 percent of first shift diners; by only 15 percent of second and third shift diners.
- For dessert, 1.9 billion *fewer* cakes and pies were eaten by Americans in the last seven years.
- Consumption of vegetables as a side dish fell 40 percent since 1978.
- Gains in beverages such as juices, fruit drinks, carbonated drinks and wine and beer were indicated while losses were tabulated in milk, coffee and tea.

## Gains in dining out

"Going out to dinner used to be a rare treat for most Americans, but now it is just part of the weekly routine," says David Fencl, publisher of the Dinner Study. This sentiment is supported by the statistics. According to the National Restaurant Association's figures found in *The Foodservice Industry: 1984 in Review*, the percentage that consumers spent of their food dollars on meals and snacks outside of the home rose from 39.9 percent in 1983 to 40.5 percent for 1984 and traffic in restaurants was up by 4.0 percent over the same period.

According to an industry source, single people set the record for eating out, averaging 5.6 meals outside the home every two weeks. Households of two people eat out 4.4 times in two weeks; households with three members, 3.7 times and households with four or more people average 3.6 times.

## It's all demographics

Affecting both trends – that of eating in shifts and the other of dining out – are the changes that continue to take place demographically. To the industry it means that foods are being packaged in smaller sizes to accommodate smaller households, foods that can be easily and quickly prepared (and microwaved) are becoming more popular and foods that appeal to older individuals who have specific nutritional and flavor needs are being developed.

*(Continued on page 22)*

# TAPPING THE POTENTIAL OF PLASTICS

FOOD ENGINEERING'S
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FE's Executive Advisory Board consists of 600 men and women representing a microcosm of the food and beverage industry. These managers and executives are helping us probe trends and buying practices throughout 1986. In this, the third report of the series, FE portrays the industry's views on food packaging materials and machinery through the eyes of our panelists.

*FE's survey results indicate a lot of interest in high barrier plastics and flexible packaging materials, along with potentially heavy equipment purchases*

The results of *Food Engineering's Executive Advisory Board* packaging survey clearly indicate the dynamic state of packaging materials and equipment. New materials are constantly being tried. Packaging equipment is constantly changing. And new products with new packaging needs are constantly arising.

Are you looking for a high barrier plastic that works? You're not alone. The single item that stands out the most in *FE's* packaging survey is interest in improved high barrier plastics.

However, before you rush off to place an order, you should know that *FE's* Executive Advisory Board also listed several concerns about the new high barrier plastics, primarily price. When asked about their greatest concerns about multilayer barrier plastic packaging, 36.9% of the panelists said that the plastics are too expensive at this point. 30.7% are uncertain of true barrier protection when the package actually contains food. And, another 20.6% want to see more equipment designed especially for handling and filling these containers.

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FOOD ENGINEERING

# MARKET BATTLE FOR THE MARKET BASKET

*With higher and higher product entry costs, it is more important than ever to know where the trends are and to effectively develop, launch, and support new efforts.*

Once again, the food industry has broken its own record by introducing more new products in the past 12 months than in previous years. That's been happening for some time, and tends to prove that the new product development process works.

Unfortunately, even many people involved in it have little grasp of what it is and how it works from start to finish. For this year's "New Product Analysis," therefore, *Food Engineering* asked some highly successful new product innovators how they do it. Here's what they told us.

*Kevin J. Hannigan – Features Editor*
*Ann E. Przybyla–Technical Editor*

## Genesis of a new product

In general, the new product process begins with a concept, followed by decisions on the attributes and benefits the new item should offer. Next comes a feasibility study to see if the product is cost effective, fol-

*(Continued on page 54)*

35.6% of the panel members considered packaging in barrier plastics to be of importance to their companies. When asked to describe a container or material they now need, but have been unable to find, many panelists said they wanted an inexpensive high barrier plastic container capable of withstanding high temperatures. Some examples of responses in this area included: "High barrier, *clear* plastic bottle that will withstand hot fill;" "high barrier plastic retortable containers which are stable at temperatures up to 300°F;" "a *clear* plastic jar which has a low MVTR and is a good oxygen barrier and can withstand mechanical rigors of packing and capping and is competitive in price with glass;" "a squeeze container with glass clarity, glass barrier properties and product compatibility able to withstand hot fill temperatures and cold temperatures during winter distribution... high impact resistance... able to be produced in wide-mouth and narrow-neck finishes...3-ounce to 1 gallon sizes."

## Flexible packaging, too

30.4% of the panelists listed developments in flexible packaging as important. Packagers of confectionery products, flavors/food ingredients and bakery products led the way in this category. On panelists' wish lists in this area: "A 'foil'-like flexible packaging material with extremely good sealing/barrier characteristics at a cost of less than 1½ cents per impression;" "a flexible packaging material with oxygen barrier properties and that is biodegradable;" "a multi-latex film that will run at high speed on finseal equipment with lower sealing temperatures;" "a damage-resistant flexible film package of large capacity with easy open and reclosure feature to replace current multi-wall bags."

Also scoring high in importance to panel members were tamper-evident packaging (27.1%), dual-ovenable packaging (22.4%), aseptic packaging of low-acid particulate foods (19.6%) and controlled/modified atmosphere packaging (17.5%).

Other areas which may have scored low overall hold significant importance for different industry segments. The packaging of aseptic high-acid beverages ranked low overall (8.5%) but in the Beverage Industry, the category scored 23.3%. Similarly, "new technology in metal containers" scored 8.0% overall but 15.1% in the Canned Fruit/Vegetable/Entrees Industry and 12.1% in the Beverage Industry. "New developments in glass packages" also scored high in the Beverage Industry (18.2%), while scoring low overall (7.7%).

## Purchasing new machinery?

Members of the advisory board named a broad range of packaging machinery that their operations are likely to purchase in the coming 12 months. At the top of the list is Coding and Imprinting machinery, with 50.3% of all operations intending to purchase some form of this equipment. 43.0% of our respondents listed Labeling Equipment as a prospective purchase. This was followed by Weight/Fill Controls with 39.4% and Cartoners with 36.6%. Significant percentages of panel members claimed imminent purchases of Horizontal Form/Fill/Seal Equipment, Vertical Form/Fill/Seal Equipment, Casing Machinery, Dry Product Filling Equipment, Bag-In-Box Systems, Palletizing Stretch Wrappers and Gas

*(Continued on page 76)*

**Tamper resistant features in which respondents are most interested**

| | TOTAL | MEAT PRODUCTS | BAKERY PRODUCTS | DAIRY PRODUCTS | FLAVORS/ FOOD INGREDS. | CANNED FRUIT/VEG /ENTREES | FATS AND OILS | FROZEN FRUIT/VEG /ENTREES | CONFEC-TIONERY PRODUCTS | CEREALS/ GRAIN PRODUCTS | BEVERAGES | OTHER FOOD PRODUCTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tamper-Evident Coatings** | 4.4% | 7.2% | 5.3% | 5.2% | 5.9% | 4.1% | 1.8% | 7.8% | 7.5% | 4.9% | 3.0% | 5.2% |
| **Break-Away Plastic** | 13.9 | 10.8 | 9.5 | 15.5 | 9.4 | 15.1 | 14.5 | 15.6 | 10.4 | 11.0 | 21.2 | 18.1 |
| **Labels, Film** | 19.6 | 22.5 | 23.2 | 17.2 | 18.8 | 13.7 | 27.3 | 14.1 | 23.9 | 19.5 | 10.1 | 17.2 |
| **Seals** | 20.9 | 15.3 | 25.3 | 22.4 | 22.4 | 20.5 | 29.1 | 21.9 | 23.9 | 24.4 | 19.2 | 25.9 |
| **Closure Linings** | 6.7 | 7.2 | 5.3 | 9.5 | 10.6 | 4.1 | 5.5 | 7.8 | 6.0 | 9.8 | 9.1 | 6.9 |

FOOD ENGINEERING'S
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Flush Systems.

We asked panel members to rank five factors in terms of their importance in making a packaging equipment decision. Topping the list is Speed/High Volume, which was ranked either first or second by more than half of the panelists. Pay-Back period was next, with a first place ranking of over 30%. These were followed in order by Low Maintenance, Changeover Capability and Reputation of Builder, which was a distant fifth. Breaking down the category even further, panelists from companies with 500 or more employees ranked Speed/High Volume even higher (60% ranking the category either first or second). Smaller companies (less than 100 employees) tended to place more emphasis on Low Maintenance and Pay-Back Period, as well as Speed/High Volume.

| **Respondents ranked several factors in terms of importance when making a packaging equipment division.** | Total | Administrative Mgmt. | Production Mgmt. | Engineering | Marketing/Sales |
|---|---|---|---|---|---|
| Low maintenance | 2.88 | 2.88 | 2.83 | 2.81 | 2.60 |
| Speed, high volume | 2.53 | 2.69 | 2.47 | 2.48 | 3.00 |
| Changeover capability | 3.22 | 3.29 | 3.44 | 3.52 | 3.29 |
| Reputation of builder | 3.55 | 3.37 | 3.47 | 3.55 | 3.50 |
| Payback period | 2.79 | 2.69 | 2.75 | 2.59 | 2.56 |

**Do sophisticated controls benefit the packaging operation?**

| YES | | NO | |
|---|---|---|---|
| Total | 79.4% | | 17.8% |
| How much better | | Why not | |
| 10% or less | 14.3% | Too costly | 23.2% |
| 10-24% | 59.4% | Not delivering on efficiency | 24.6% |
| 25-49% | 21.1% | Too complicated for operators | 18.8% |
| 50-100% | 3.6% | Need tie-in to central computer | 14.5% |

Another question asked of panelists concerned automation. We asked if all the microprocessors, computers and other electronic controls have produced benefits for their operations. About four out of five respondents say that automation *has* produced benefits. Of this group, over half (59.4%) place this gain in the 10% to 24% range. Of the negative respondents, 24.6% say that the automated equipment is not delivering on promised efficiency and 23.3% claim that the equipment is "too costly".

## Tamper resistant packaging

Tampering is an issue that has received a great deal of recent attention. We asked panelists to tell us what types of tamper-resistant features they are considering adding to their packages. Of the 75.8% of the panelists who responded to the question, a fifth (20.9%) named simple Seals as type of tamper-resistant packaging in which they were most interested. An almost equal number (19.6%) cited Labels or Film and another large portion (13.9%) said Break-Away Plastic closures.

It is clear from the comments we've received that tamper-evident/tamper-resistant features are no longer a luxury on food packaging. They're expected to be an inherent part of any newly designed package. Panelists want "better tamper-proof features," "tamper-proof, recloseable packages (boxes and bowls) that don't require additional equipment to seal," "more tamper evident features (not yet seen) that are built in to lids, caps and other closures."

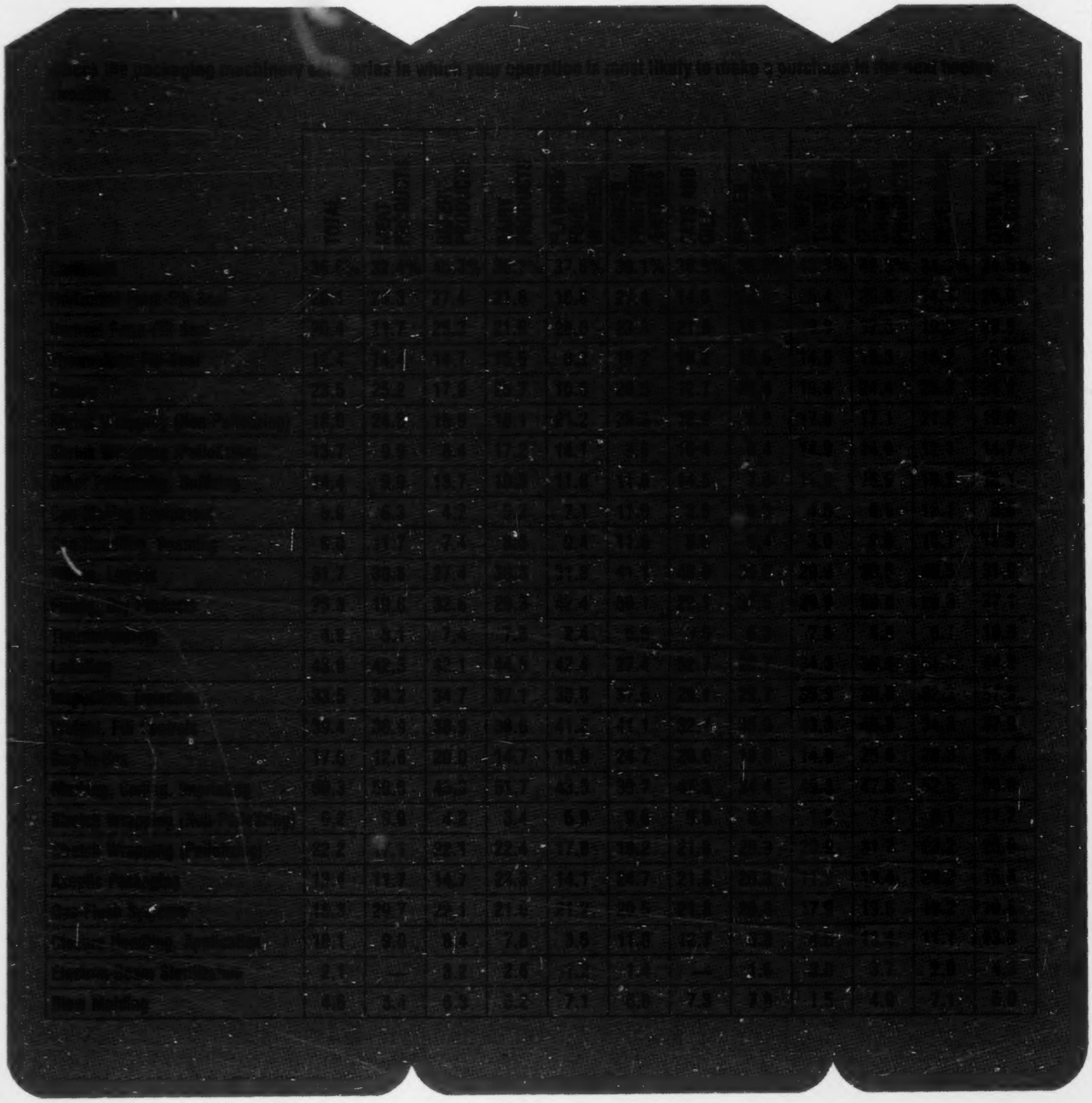
## Purchasing foreign equipment?

The purchase of foreign equipment has been an issue for food packagers. Foreign equipment purchases have been attractive because of the high value of the American dollar, although there are very real concerns about parts availability. More than a third of our panelists (37.9%) said they were "very likely" to consider purchasing foreign equipment and 81.5% said they were at least somewhat likely to do so. Of those very likely to purchase foreign equipment, the primary reason given was that foreign packaging equipment is more innovative (39.5%). A substantial number (31.3%) said that foreign equipment is made better. 25.9% said that it is "more customized to my needs." Only a few (2.7%) said that foreign equipment is less expensive.

In commenting on the purchase of foreign equipment, one panelist said, "Foreign equipment suppliers offer innovative ideas to gain a foothold in the American market, while American companies only offer 'me too' ideas when pressed. The drawbacks with most foreign machines are lead time and parts availability." One man believes that "the Federal agencies (FDA, USDA, etc.) 'scare off' U.S. packaging companies from being too different." Another purchaser says, "I'll buy from anybody who gives me the best price, best service and most maintenance backup for the machine which suits my needs and performs reliably." Another panelist claims, "Foreign suppliers are on the leading edge of packaging technology, while American suppliers seem unwilling to invest the time and money into research and development."

Whether or not to use contract packers is another question facing food processors. Contract packaging allows processors to try different types of packages or to expand volume beyond their own capabilities or to try

*(Continued on page 79)*



market tests on new products without disrupting production or to make smaller batches that would be inefficient on their own lines. Slightly more than half (50.5%) of our panel members said they were encouraged to either begin using or increase their use of contract packagers. Use of contract packers is particularly high among members who are involved with Canned Fruits, Vegetables and Entrees (75.3%) and Cereals/Grain Products (73.2%). A quarter of the panelists said their use of contract packaging would increase by 10% to 24% over the next five years.

Panel members interested in dual-ovenable packaging were asked to choose the material or container that will best fill their needs for this type of packaging. Their responses indicate an overwhelming preference for two types of materials. One third (33.3%) of the members responding chose Crystallized Polyester (CPET), while over a quarter (26.9%) chose PET-Coated Paperboard. PET-Laminated Paperboard, Other Plastics, Aluminum, Pressure-Formed Plastic and Thermoset PET claimed small percentages of those surveyed.

## Packaging wish list

We asked our panel members to describe containers or materials they now need, but have been unable to find. We hoped that this kind of information could encourage suppliers to do some development work in these areas. We have asked this question before in other surveys and as always, we have gotten some interesting responses:

"It would be nice to have a packaging system made from aluminum that could be 'safely' microwavable. This packaging system could serve as a package-serve-cook all-in-one system."

"A barrier bag which is impermeable to oxygen, but will allow carbon dioxide and hydrogen gas out."

"We would like a replacement for our #10 can that is sturdy, lightweight, inexpensive, retortable and made of safe materials."

"We need a high speed packer with the capability of thermoforming a variety of sizes that can provide an aseptic container without chemical sterilization. This packaging machine should allow for microwavable container material and allow for fill adjustment on the run."

"A thermoformable, semi-rigid, clear material for both the body and lidstock with at least as good barrier properties – moisture and oxygen – as the co-extruded laminates used in squeezable bottles."

As you can see from our survey results, plastics are very much on the minds of packaging executives. They see packaging possibilities with the high barrier and high heat-resistant plastic materials. And they want these possibilities to become reality.

FOOD ENGINEERING'S
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PANEL

**Over the next five years, how much will the use of contract packaging increase?**

| | Total | Administrative Mgmt. | Production Mgmt. | Engineering | Marketing/Sales |
|---|---|---|---|---|---|
| Less than 10% | 15.7% | 14.2% | 15.1% | 14.5% | 13.5% |
| 10%-24% | 25.0 | 22.0 | 11.6 | 24.5 | 10.8 |
| 25%-49% | 7.2 | 5.5 | 4.7 | 5.5 | 8.1 |
| 50%-100% | 2.6 | 3.1 | 1.2 | 0.9 | 5.4 |
| No answer | 49.5 | 55.1 | 67.4 | 54.5 | 62.2 |

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OCTOBER 1986

# FOOD ENGINEERING

SINCE 1928, THE SOURCE ON PROCESSING, PACKAGING, AND PRODUCT DEVELOPMENT

# FOOD ENGINEERING

**COVER STORY**

Our sixth annual New Product Analysis takes you behind the scenes to see the machinations of new product development staffs that each processor hopes will result in the success of his new product offering.

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**FOOD ENGINEERING®** (ISSN 0193-323X) October 1986, Vol. 58, No. 10. Published monthly by Chilton Company, Chilton Way, Radnor, Pa. 19089 (Telephone 215/964-4000). Chilton Co. is a division of American Broadcasting Companies, Inc., New York, N.Y. Second Class Postage Paid at Wayne, Pa. 19087 and additional mailing offices. Title registered in U.S. Patent Office ©Chilton Company, 1986. All rights reserved.

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## News

**12 Industry Report**

This month's Report discusses CIM and how companies struggle with cost-justifying the expenditure of capital; pizza consumption continues to climb, meaning growth for the pizza industry and for its suppliers; problem pesticides that continue to pose a deep-rooted concern for the food industry; Tasty Baking Co.'s suit against Ralston Purina over the Drake Bakeries acquisition; the growth in consumption of reduced-calorie products; and corporate news from the industry.

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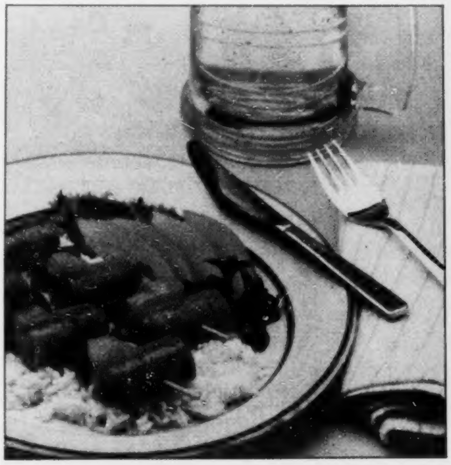

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## Features

**53 New Product Analysis**

This year's analysis examines the new product development process, from idea to post-introduction. The process must be working: The past 12 months has seen a record-breaking number of products introduced.

**75 Is It Time For Thailand?**

As more and more U.S. food companies do business in Thailand, *Food Engineering* takes a first-hand look at what the country has to offer. By tapping into the resources of Thailand, U.S. firms have gained labor and market advantages.

**83 Acidulants**

Recent marketing, regulatory and technological developments have given the acidulants market a shot in the arm. New applications have been found that are boosting the volume of acidulant usage, considered a "mature market".

**THAILAND: PAGE 75**

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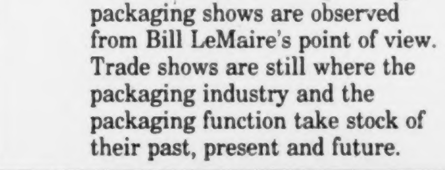
## Food Packaging

**42 Controlled Atmosphere**
From Europe comes controlled atmosphere packaging and controlled atmosphere storage. Applications range from atmospheres that extend shelf life to headspace pressurization of aluminum cans for added strength when containing non-carbonated beverages.

**48 Life Extension**
Food engineering, technology and science have one goal: to preserve food by retarding degradation and spoilage. Packaging technology continues to strive to extend the quality of food for an ever-increasing length of time.

**50 Barrier Packaging**
The grade and thickness of an EVOH layer within the plastic structures of a barrier package can make or break a package. Now there is a computer simulation program to assist in evaluation of barrier performance.

**51 Trendwatch**
New York's new Jacob Javits Center will host PACK EXPO. That show and other upcoming packaging shows are observed from Bill LeMaire's point of view. Trade shows are still where the packaging industry and the packaging function take stock of their past, present and future.



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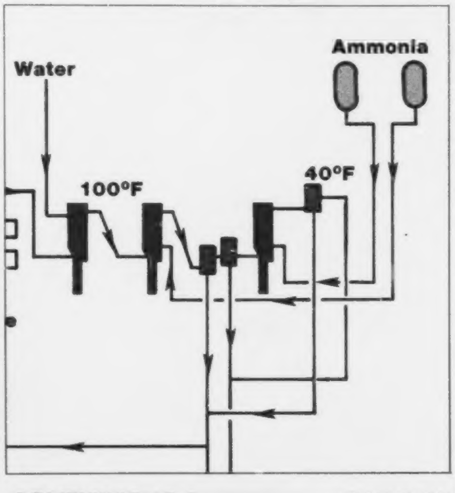


**CONTINUOUS SYSTEMS:** **PAGE 90**

*Special Emphasis*

**ACIDULANTS:**
Acidulants, considered a mature market, have boosted volume and applications in certain market segments thanks to marketing, technological and regulatory advances. **Pages 83 to 88**

# CIM: A survival strategy that's an accountant's nightmare

If you ask CIM experts for a definition of computer integrated manufacturing, know what you get? Laughter . . . hesitation . . . and evasive tactics, but no real answer.

They will agree that CIM is a total automation strategy that allows adaptation to changing technology, making it possible to keep pace with changing markets and that CIM ties together the manufacturing process with all levels of operation so that the company's strategic business plan can be achieved. But a hard definition is difficult to come by.

Dr. Malcolm Beaverstock, manager of advanced management technology at Foxboro Co. told *FE,* ". . . There is no one definition . . . It is a frame of mind and it is a way of operating . . . an operating philosophy rather than a package of software."

Ray Meillier, vice president and controller at Campbell USA sees CIM as a "leading edge technology . . . We recognize it is an R&D effort in a real operations environment."

Rick Marquardt, manager of manufacturing industry for Management Science America puts it succinctly: "CIM is a total business strategy . . . It is a survival strategy.

## And that's what it is

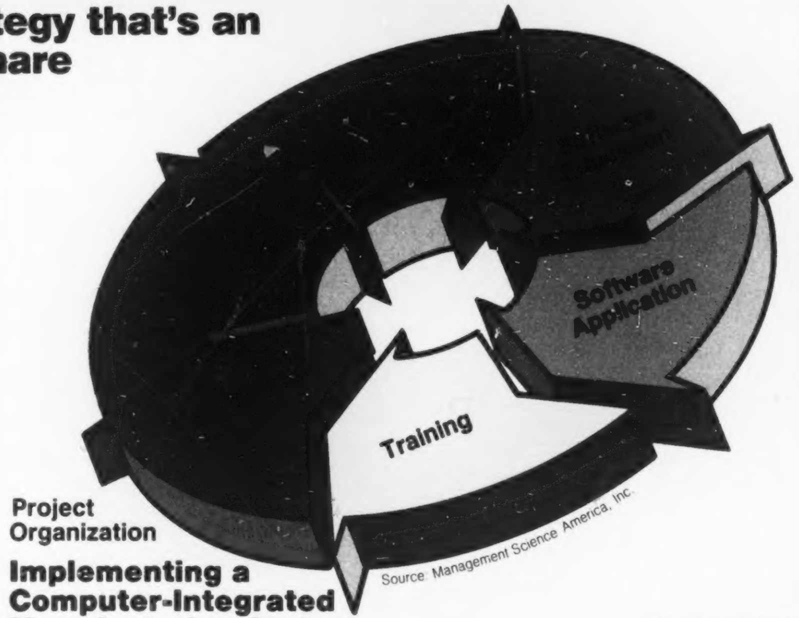
In the competitive, aggressive marketplace of today, CIM is, in truth, a survival strategy.

Beaverstock feels it is necessary to look at CIM with the following strategy: "Can I gather a bigger section of the market if I can put a new product out quicker? Can I get a bigger portion of the market and become a dominant supplier?"

What CIM offers is a system to encompass a company's total operation so that all facets of the organization are working together to produce the product line and achieve marketing goals. It is, says Marquardt, a "total business strategy" and it requires planning and coordination from the boardroom down through all levels of operation through distribution.

In order to implement CIM, however, says Marquardt, "you must have a total plan" for implementing it. It must be a well-conceived, well-orchestrated course of action so the transition will be as easy as possible with mimimal interruption of operations.

But how do you cost-justify a plan when the results are five or ten years away? Industry experts on CIM will tell you that the process can't be justified in traditional terms of ROI, hurdle rates or discounted cash flow. But



**Implementing a Computer-Integrated Manufacturing System**

Source: Management Science America, Inc.

**Management Science America recommends this approach to implementing a CIM system.**

# Step aside roast beef... the U.S. is eating pizza!

If you're looking to get into a new line of business, make it pizza. Or be an ingredients supplier to the pizza industry. This crusty italian pie, according to a recent study by MRCA Information Services, is now served in 96 percent of all American households. MRCA further estimates that individual consumers now hoist a slice about 30 times a year.

"We're finding that more and more households are eating pizza at home one day, and in a restaurant another day," said an MRCA spokesman. "The number of households having pizza during a typical two-week period has grown by 16%, but the number of households eating pizza both at home and away from from home has grown 31%," he continued.

| Top Pizza Franchises* | Number of Stores | | Total Sales ($000,000) | |
|---|---|---|---|---|
| | 1986 | 1985 | 1986 | 1985 |
| Pizza Hut | 5,120 | 4,600 | $2,100.0 | $1,800.0 |
| Domino's | 3,140 | 2,200 | 1,100.0 | 626.1 |
| Little Caesars | 900 | 720 | 340.0 | 175.0 |
| Pizza Inn | 736 | 804 | 120.8 | 253.0 |
| Godfather's | 671 | 887 | 265.0 | 345.0 |

*Figures are taken from July 1986 issue listing Pizza Today's Top 25 Franchises.

Source: Pizza Today.

**Fiscal year 1986 showed dynamic growth for Domino's pizza, and Pizza Hut continued to be No. 1 in the marketplace.**

while justifying it may be more difficult than justifying other decisions, it is harder, according to Marquardt, to justify *not* going ahead with CIM.

## Cost-justifying CIM

Mellier says that at Campbell they "do not try to cost-justify CIM because it is a leading edge technology." You can, however, look at "IRR (investment return ratio, commonly used by planners to justify capital expenditures) done on an ad infinitum basis over a period of 10-12 years." This would take into consideration the "residual value of both the technology and the earnings stream..."

Campbell also looks at CIM as having a pay-off value over time. With time, says Mellier, CIM will get "a fair evaluation." And he cautions: "U.S. manufacturers better be ready for the Japanese invasion – they are high tech. That is why we spend money in some cases without totally defined savings. Some of these things are going to be necessary as barriers to entry." CIM then becomes a strategy to ward off further attempts by foreign manufacturers to enter the U.S. market.

"There is no consistent method that anyone is really presently using (for cost-justification)," says Beaverstock, because present accounting systems "just can't cope with CIM... mainly because it is based on an entirely different set of principles – it overemphasizes direct labor and other specific direct costs." So, he says, when a company "cannot manage the numbers," the decision to go with CIM becomes a political one. Rather than funding a project where the numbers have been worked out in advance, the decision to go with CIM becomes part of the company's long-term strategy. In fact, Beaverstock was told by one person whose company was adapting to CIM..."I don't fund projects, I fund strategies."

## The savings are real

There are, of course, real savings to be realized from CIM, including:

- Inventory savings through a more orderly product flow.
- Better quality assurance – each piece or each batch will be just like the one preceding it.
- The chance to cut down on work-in-process levels.
- Reduction in floor space needed for operations.
- Shorter throughput times.

All of these things will positively affect cash flow and lower product cost. Yet none can have a precise price tag put on them. And there is, of course, a not inconsiderable amount of money to be spent in upfront engineering for CIM (estimated by Foxboro's Beaverstock to be 10 percent of total project cost) and in implementation costs as the strategy is carefully implemented over a lengthy period of time.

So companies continue to struggle with cost-justification procedures for CIM. But, as one industry spokesperson said, echoing SMA's Marquardt, "CIM is something you can't afford *not* to justify."

*Look for Dr. Malcolm Beaverstock's bylined article on computer integrated manufacturing in the November issue of Food Engineering.*

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Pizza has come out of the "snack" division and entered the prime eating time–the dinner hour. According to the *Annual Report on Eating Out* published by the Gallup Organization, 61% of their 1,048 respondents to a telephone interview said they consumed pizza at dinner, while only 20% ate it at lunch and 18% for a snack.

## Franchises doing well

A significant trend within the pizza industry is the "carry-in" segment of the market–covering pizza that is delivered, or picked up and carried home. The carry-in share of market has grown 50% since 1981, according to MRCA.

Pizza Hut, the largest pizza chain in the world, has realized considerable success since its inception in 1958. There are now more than 5,120 stores carrying the Pizza Hut banner and sales for 1985 are estimated to be $2.1 billion, says *Pizza Today,* up from $1.8 billion in 1984.

Pizza Hut is not only an "eat-in" pizzeria (menu includes a salad bar and items other than pizza), but also has carryout service. But in an attempt to garner an even larger share of the marketplace, Pizza Hut is this year adding about 500 delivery-only stores to capture a segment of the delivery market.

The franchise showing stunning growth, says to *Pizza Today,* is Domino's which grew from $626.1 million in sales in 1984 to $1.1 billion in 1985. Domino's is mainly a delivery pizza business and prides itself on service, promising 45-minute delivery of an ordered pizza or the pizza will be free.

Whether the pizza is being baked at home or is being consumed as part of the carry-in market, the fact remains that business is brisk.

But, says David Fencl of MRCA, "Despite pizza's strong growth over the past four years, many market segments remain underdeveloped. Pizza, perhaps more than any other product we've looked at, seems to hold unique opportunities for segmentation strategies. Manufacturers might be able to choose a particular audience and make a product especially tailored for them." An example: "Dessert pizza" with a range of toppings including nuts and cinnamon and sugar.

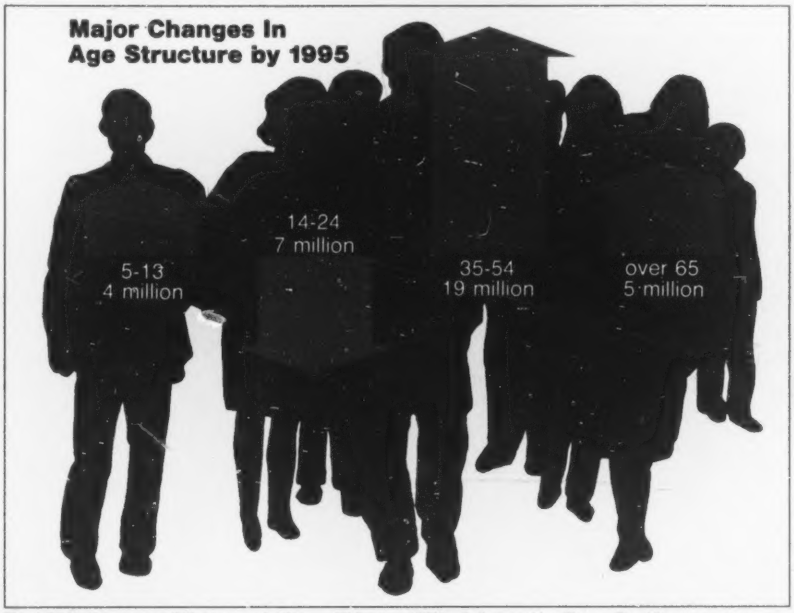
So there are still challenges there for suppliers. Find the right niche and it'll be a "piece of cake"...or should we say a "piece of pie"...to find market success.

**At what meal did you last eat pizza?**

**A Gallup Organization study revealed that more people are eating pizza for dinner than for lunch or as a snack.**

Source: The Gallup Organization

# Changing U.S. demographics will create new market opportunities



By 1995, the age of the population will have shifted dramatically, reflecting a more mature marketplace. The biggest jump will occur in the 35-54 age bracket, with a projected increase of 19 million people.

The U.S. food industry will undergo more change during the next decade than at any time in its history, according to Randall & Co. of Los Altos, CA. The total consumer value of the market will increase from about $400 billion in 1985 to $750 billion in 1995. After estimated inflation of 5 percent per year, this represents real growth of about 1.5 percent per year during the next decade. While this total market growth is lower than many industries, the variability among sectors and change in the trends affecting these totals will be substantial. Customer demographics, lifestyle patterns and overall food consumption needs will shift dramatically.

During this same period, food industry organizations will be aggressively attempting to reduce costs through such means as new, high technology based productivity systems. The resulting competition will be enormous with new competitions, consolidations and battles for market share. Yet, with the resulting changes at all industry levels, there will be more opportunity for real growth. An estimated $100 billion in total real growth will be added during the previous decade in a myriad of new product and service offerings. This is up from the estimated $60 billion of real growth added during the previous decade. Forward thinking organizations will work with these changes and adopt aggressive strategies that will address the new requirements for success in the future.

## Demographic changes

The total number of potential customers for food products and services in the United States will increase from an estimated 239 million people in 1985 to 260 million by 1995. This increase of 21 million people represents an average annual growth rate of about 0.9 percent.

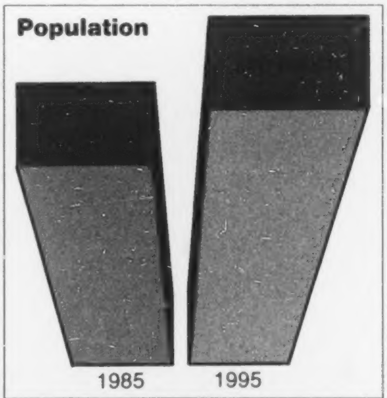
Changes in age structure during the decade will be dramatic. There will be an additional 19 million potential customers in the 35-54 age range. This group, which is composed mainly of people born during the post-War baby boom, will grow more than three times as fast as the total population. There will also be about 5 million more elderly people (over age 65) and over 4 million more young children (age 5-13). Offsetting these increases will be about 7 million fewer teenagers and young adults in the 14-24 age group. This void is the result of the baby boomers growing up.

The ethnic and minority segment of the population will be nearing 25 percent of the population by 1995. Of the 21 million population increase projected during the decade, almost 12 million will be Blacks, Hispanics and other minorities. This group will grow at twice the rate of the total population and nearly four times as fast as the white population.

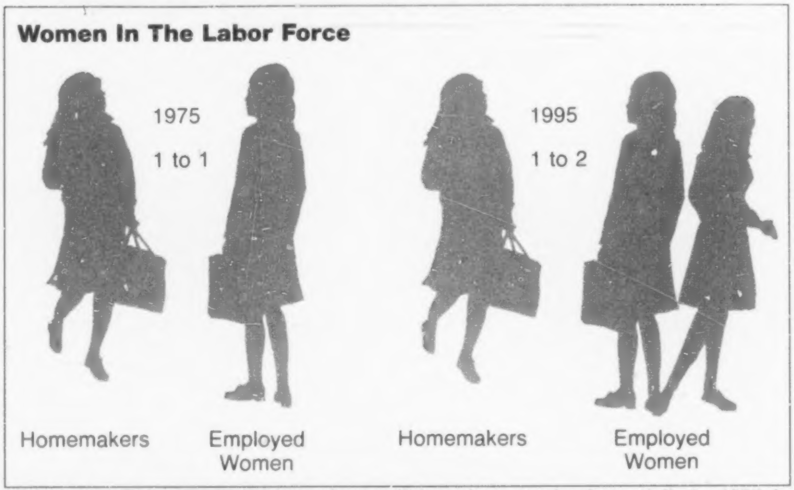
For the next decade there will be more population growth in the South and West than in the total United States. Population losses will continue to mount in the East and Midwest. Total sunbelt population will increase by 23 million people, with nearly half of this growth taking place in three states: Florida, California and Texas.

By 1995, nearly half of the total labor force will be women. During the decade, women will join the labor force at twice the rate of men, as trends toward gainful employment for women, women's careers and two-income families continue. By 1995, 60 percent of all women age 16 years and older will be in the workforce, up from 55 percent in 1985. The intensification of this trend is further illustrated by the fact that by 1995, the ratio of employed women to full-time homemakers will be two to one. In 1975, this ratio was only one to one.

The total number of households will increase by 17 million units to 104



The total U.S. population will increase by less than 10% over the next decade.

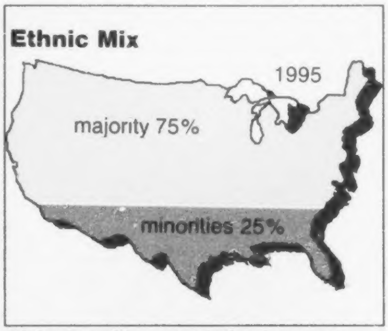

**Women In The Labor Force**

**The number of women in the labor force will have increased substantially by 1995. In 1975, there was one woman homemaker for every employed woman. By 1995, there will be two working women for every homemaker.**

million by 1995 and will grow at an annual rate of about 1.8 percent per year. This rate of growth is about twice the rate of the estimated total population increase. The difference between these two growth rates reflects a shrinking of household size as the number of singles, single parents and single, non-family households grows during the decade. By 1995, 45 percent of all households will be headed by a single or a single parent. Single household growth will be affected by increased acceptance of the single lifestyle, continued high divorce rate, postponement of marriage, increased longevity and more temporary living together arrangements. Traditional families (married couples with children under 18) will represent only 25 percent of all households by 1995, down from 28 percent in 1985. Average household family size will decline from an average of 2.7 persons in 1985 to 2.5 persons in 1995.

Real disposable income will increase by about the same 2 percent real rate as in the past. The reduction of industrial jobs and the increase in service jobs will result in lower relative compensation for some workers. This will be offset by the continued need for management and technical people with higher skill requirements and compensation levels.

Anticipated changes in the demographic and economic mix of the population will result in the United States moving toward a two-tier market for food products and services, tiers that Randall & Company refers to as upscale and functional value. By 1995, an estimated 30-40 percent of the population will be looking for products and services that will provide major benefits beyond pure function, including added comfort, convenience and emotional satisfaction. The maturing of the baby boom population will provide major growth for the upscale category. The rest of the population will be looking for food products and services that primarily provide functional utility at a good value. Many single and single-parent households, the elderly, displaced industrial workers and others on limited incomes will fall into this category. The net result will be the establishment of two, rather than three tiers of consumers. The middle class will essentially fall into one of the other two categories.


**Ethnic Mix**

**Of the 21 million population increase projected during the decade, almost 12 million will be Blacks, Hispanics and other minorities.**

The decade will produce more customer food and food service purchasing decisions that are dictated by wants rather than just needs. This broadening of purchase options will also be accompanied by an increase in the number of inner-directed customers who are taking charge of their own lives, including the aspects of food purchasing and consumption.

## Strategic imperatives

In order to manage the coming decade's changes effectively, organizations in every sector will need to implement certain base strategies.

Successful food industry organizations will need sharp **strategic vision** and the ability to manage the strategic planning process.

Excellence in **value-added marketing** will be required in all sectors of the industry.

**Quality** will have to be a non-negotiable in every organization.

**Optimum cost management** will be required by all food industry organizations to remain competitive.

Organizations will need to be **people-centered** in order to achieve maximum effectiveness.

Helping to provide industry organizations with the flexibility to achieve strategic objectives will be **decentralized organizational structures.**

The ability of individual food industry organizations to **manage assets** effectively will be a critical determinant of relative success.

**Management systems** will need to be synchronized with business needs.

Changes in the future requirements of the food industry will dictate new sets of **skills and capabilities** in order to manage effectively.

The strategic management of each organization in the food industry will involve detection of emerging opportunities and threats, predictions of their future impact and development of appropriate organizational responses. Those who understand these changes and the new requirements for success will have the opportunity to attain new heights of prosperity.

Information for this article was obtained from Randall & Co., One-Eleven First St., Los Altos, CA 94022

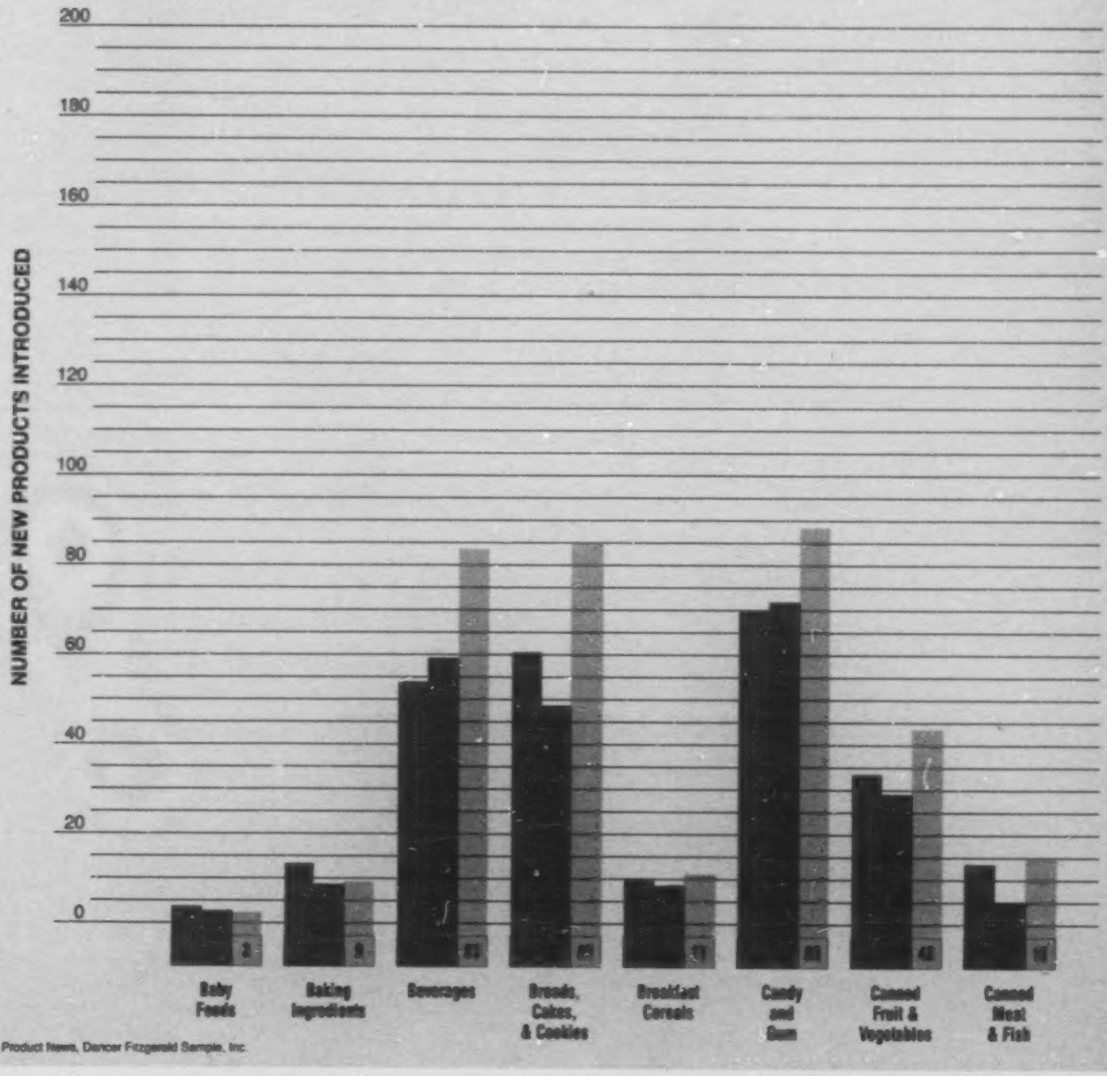
Insert 20 on Inquiry Card →

lowed by taste tests in the lab (shortly before lunch). Several variations of the product are prepared at the lab stage, and one or two may be produced in slightly larger volume by the test kitchen for taste panels.

If all goes well, the new product moves into the pilot-plant. Here, for the first time, a package may be needed. Often, you'll recruit a blank package from stock, since you already have equipment to use it. Meanwhile, Marketing decides how and where to test market the new product. They also come up with a suitable carton design or can label. At this point, advertising for the product already is in a formative stage.

After the initial test market, the data is analyzed and changes may be made to the product, package, advertising, etc. This is where mistakes are corrected and the entire concept is questioned. Sometimes, you have to redevelop the product from scratch. Then, since you're more confident of success, you'll reintroduce the new product into a limited test market, probably using one existing line in your plant. This will give you that much-needed data on how to scale-up to full production. Finally, when the market tests are successful, that same production line will be ready to supply product for a gradual rollout while other facilities are gearing up

**1986: Shaping Up Strong** Six-month (January to June) comparisons by number of introductions, 1984-1986.



Source: New Product News, Dancer Fitzgerald Sample, Inc.

to serve the eventual national market.

That's the general view of the new product development process. But how does it actually work in practice? And who does what? At ConAgra, we discover, R&D does all the new product development. "They decide what products are to be developed," reports Susan K. Hanley, manager of product publicity for ConAgra's Consumer Frozen Food Companies (which markets *Armour*, *Banquet* and *Delmonte* brands).

At ConAgra, it takes 1-5 years to develop a new product. And the first step is developing a plan to cover concept testing, product name, package design, product testing, volume projections and the marketing plan (advertising, promotions, etc.). The concept for the new product comes from a variety of places, says Hanley: "Consumer trends, basic research, both qualitative and quantitative (focus groups, concept tests), line extensions, new technology (aseptic packaging, microwave), other countries (yogurt) and fast foods (chicken nuggets) are examples."

Hanley explains that "we do consumer tests, test marketing, and we go from there. There's a plan to follow. We stop, and check, and make a decision to go ahead with the new product or to drop it." If ConAgra de-

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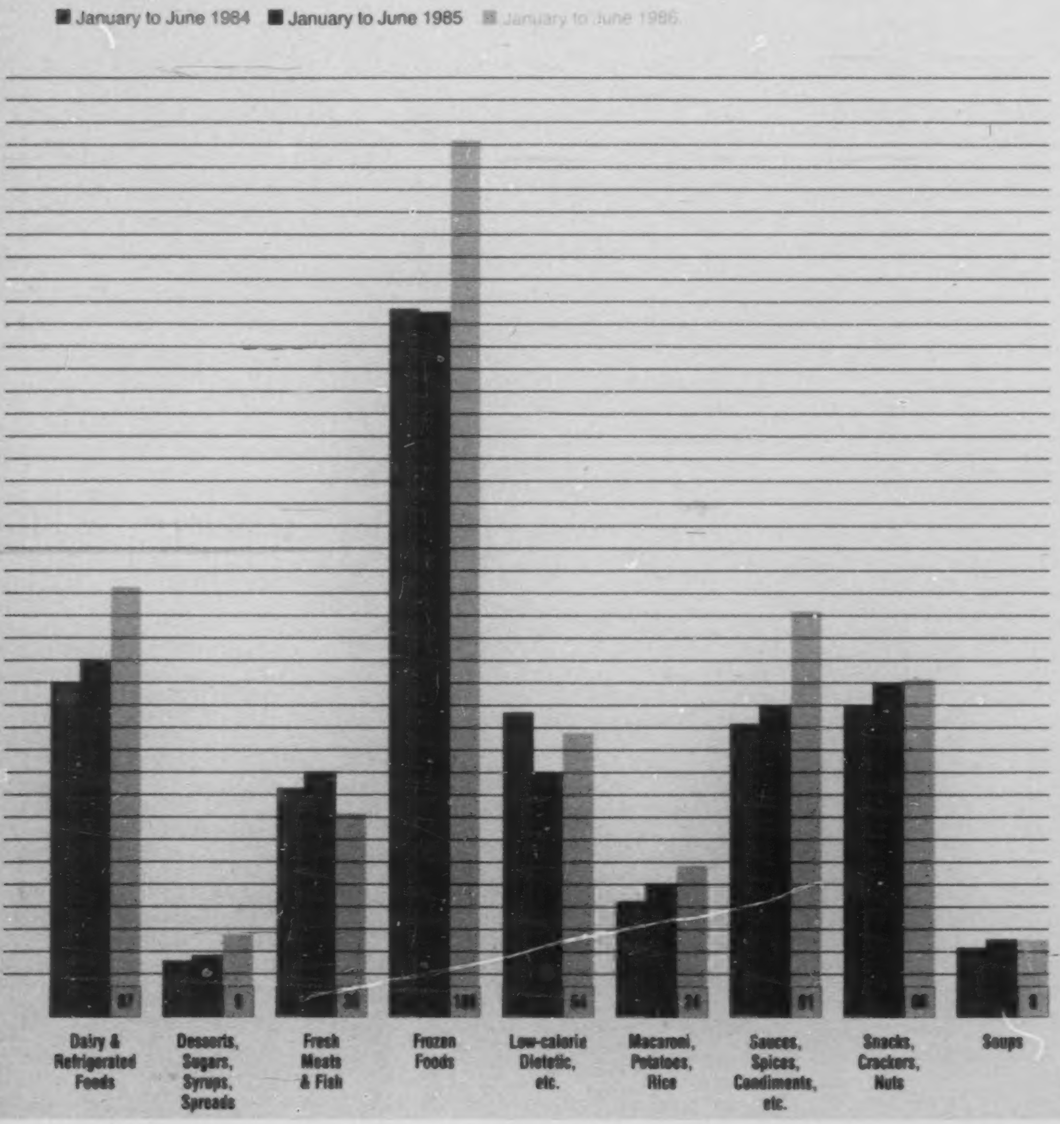
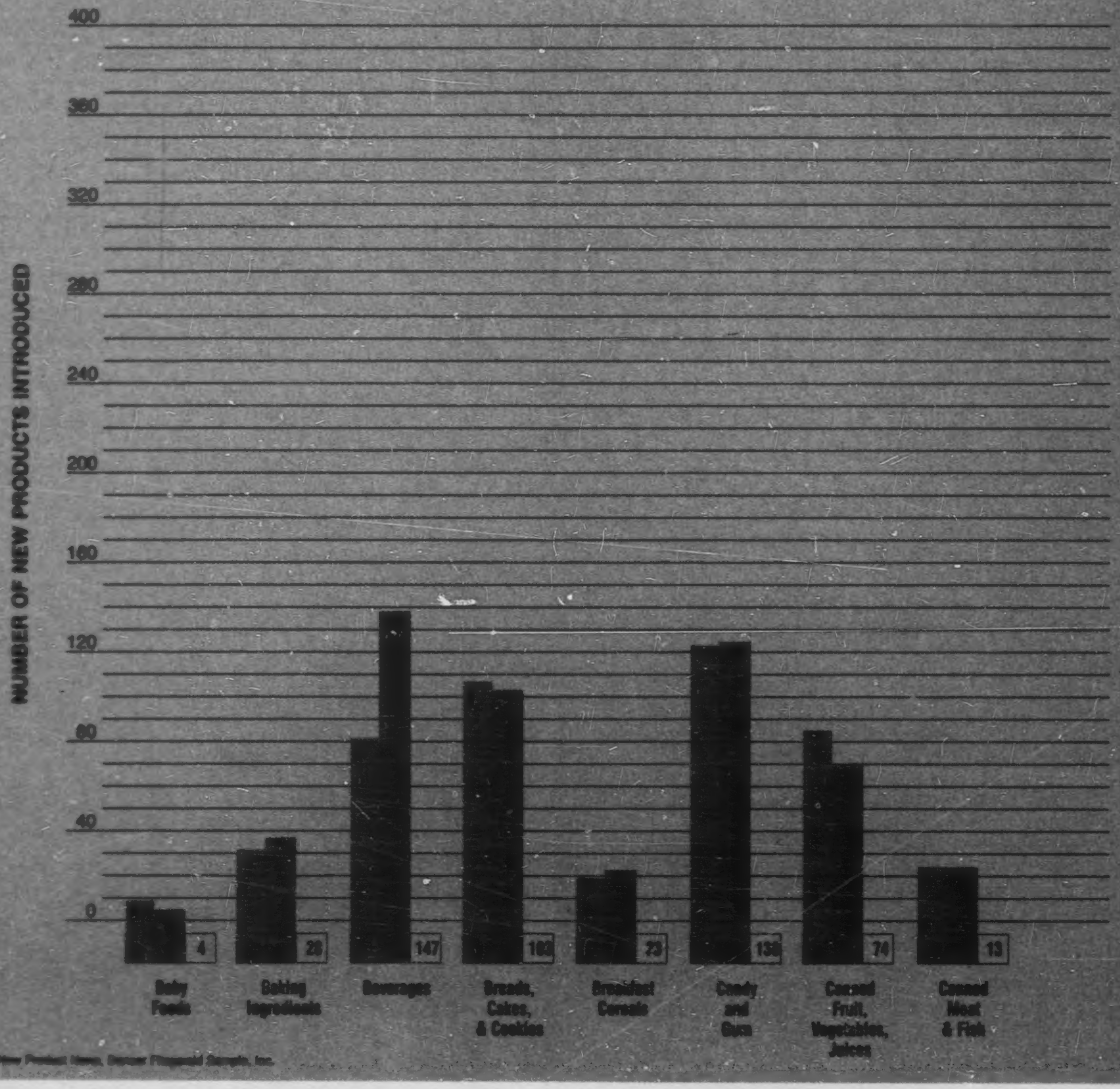


cides to go ahead, the advertising support will vary with the product. "It depends on competitive spending, share of market targets, and the uniqueness of products or positioning," Hanley says. "In the food business, we'll typically spend $5-15 million."

The total cost of developing the product, however, may be much higher. The test market alone, says one food industry executive, can cost $1-2 million. And Columbia Business School Marketing Professor Donna Hoffman recently estimated the cost of bringing a product from R&D through the complete test cycle and into the national market at $3-5 million. And that doesn't include advertising support.

Obviously, at those prices, you have to be careful. An industry observer with considerable experience in food marketing points out: "There are many considerations before deciding to introduce a new food product. Basically, you ask yourself, is there a market? And do you want to play in that market? Given all the considerations, can you compete effectively in that market? In general," he sums up, "you should go with your experience. If you know a market, are producing and distributing for that market, then your chances of success are enhanced."

**New Products, 1983-1985** Whole-year comparison's by number of introductions.



Source: New Product News, Dancer Fitzgerald Sample, Inc.

## Where new ideas come from

Rare is the new product that comes from a bright mind and springs directly to the retail shelf. One expert notes that "a host of folks" are involved in bringing products to market. "Certainly, marketing people are in at the concept stage. Then you being to work through Quality Control, Production, Home Economics, the focus groups, panels and test markets. By that time, the product is pretty well developed."

At General Foods Corporation, for example, Peter A. Acly, associate manager for corporate issues, explains where these concepts come from: "Development of our new products can be sparked either by the 'push' of advancing technological capabilities or by the 'pull' of the marketplace. Sometimes it's a combination of the two.

"On the technology side," says Acly, "that 'push' has a lot of muscle behind it. General Foods now spends about $120 million per year on research – about 15% of total U.S. food industry research expenditures.

"During the next decade, consumers will see the results of dramatic technological developments in many fields. These include biotechnology, our understanding of human taste perception, new non-chemical preser-

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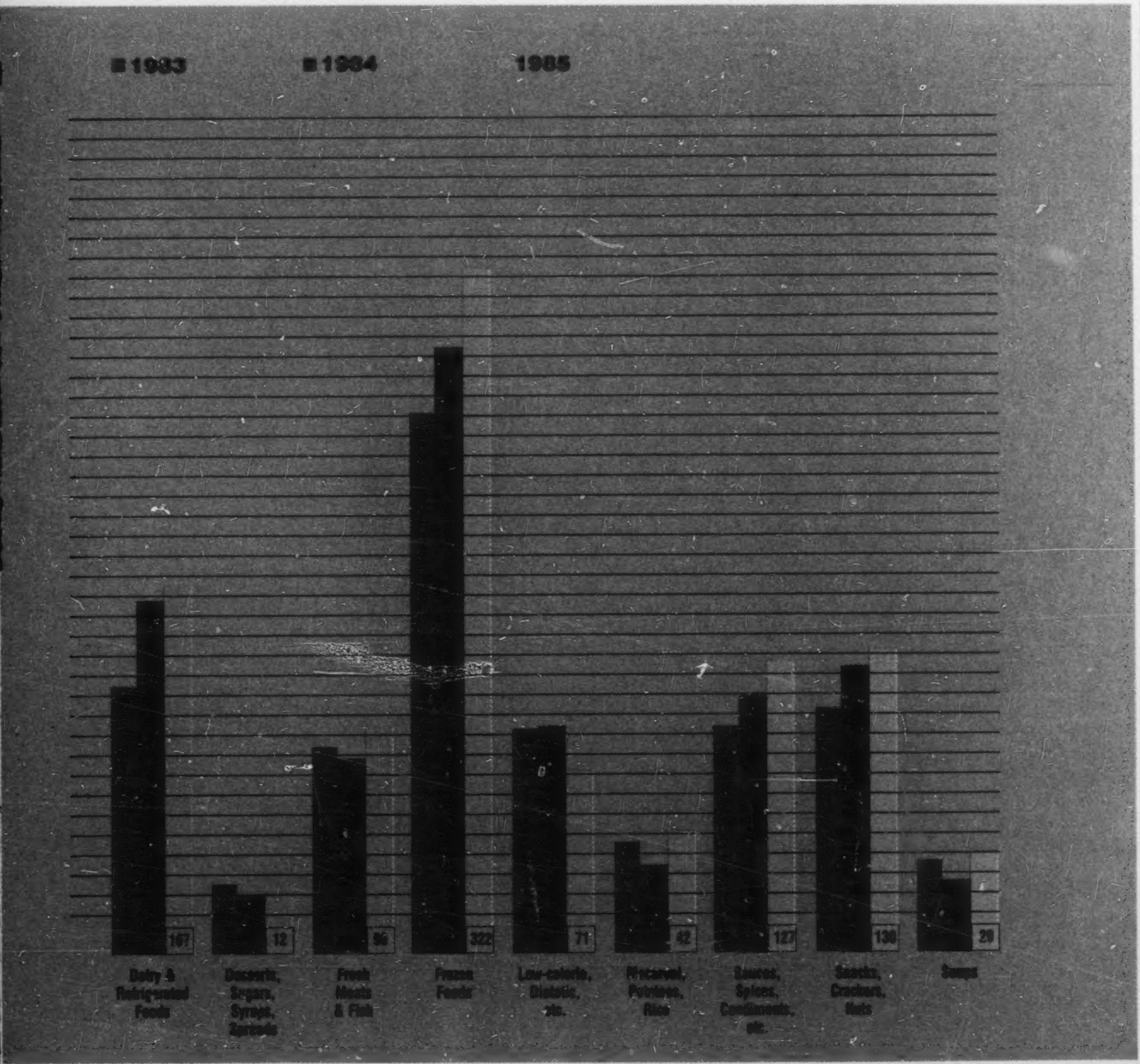


vation systems, our knowledge of nutrition and health, and processing technology in general. All of these are subjects of major research programs at General Foods.

"The 'pull' of the marketplace is also a key factor. We've witnessed sweeping lifestyle changes in the United States in recent decades – working mothers and single-parent families, for example. These changes are having major effects, both on attitudes about food and on purchasing behavior.

"General Foods stays in touch with consumer needs in several ways. Our Consumer Center interacts directly with over a hundred thousand consumers every year – through focus groups, letters and calls to our toll-free numbers. We also use syndicated surveys to track consumer attitudes on a range of issues. These methods help us to learn what consumers are thinking and pinpoint voids in the marketplace.

"New product development occurs in the context of constant interaction between the technical research, marketing and consumer affairs functions. That process of feedback and interaction is vital to ensure that

CALIFORNIA COOLER
Natural Fruit Particles Retained
CALIFORNIA COOLER
ORANGE

## New wine coolers despite shakeout

Although the wine cooler market's expected shakeout out has begun, the onslaught of new product entries continues. To verify this one only needs to look at the accompanying chart showing the wine coolers introduced from the beginning of 1986 through last July. It is also interesting to note that the new coolers are from large and small companies alike.

But amidst these new market entries, a number of companies are pulling their product from the market. Coors withdrew its malt-based *Colorado Chiller;* Schenley pulled *DuBonnet Splash* from test markets; and *Wine Time Cooler* is no longer available from Sante Mineral Waters – a recent Anheuser-Busch acquisition. It seems surprising that with several of the giants pulling wine coolers from the market, a steady flow of new

### Wine Coolers, 1986

The growth of the wine cooler market is perhaps best illustrated by the fact that between January and July of this year, 26 new players hit the shelves.

| Product | Manufacturer | Comments |
|---|---|---|
| **January** | | |
| **I.C. Cooler** | Pittsburgh Brewing<br>Pittsburgh, PA | malt-based citrus beverage |
| **Hi-5 Cooler** | Tom Pree Wine<br>New York, NY | made from 100% NY state grapes |
| **Kedem Cooler** | Royal Wine<br>New York, NY | kosher, contains 5% wine |
| **Bachelor Wine Cooler** | SCS Cellars<br>Roseburg, OR | made with Oregon red wine |
| **February** | | |
| **Bavarian Berry Wine Cooler** | 21 Brands<br>New York, NY | imported, German product |
| **Matusalem Wine Cooler** | Ron Matusalem<br>Auburndale, FL | contains rum and citrus |
| **Country Cooler** | Vineyards Unlimited<br>Los Angeles, CA | raspberry, garden strawberry, and fruit punch flavors |
| **White Mountain Orange Cooler** | Stroh Brewery<br>Detroit, MI | orange flavor being added to line |
| **WP Cooler** | Bedford<br>Tuscon, AZ | made from California chablis and natural fruit flavors |
| **20/20 Raspberry Cooler** | The Wine Group<br>Ripon, CA | line addition |
| **California Splash Cooler** | California Splash<br>Pleasonton, CA | fruit flavor added to line |
| **April** | | |
| **Pommay Cooler** | Cidermill Distributors<br>Roseville, CA | apple cider cooler with 4% alcohol |
| **Tropical Cooler** | California Cooler<br>Stockton, CA | third flavor—tropical—added to line |
| **Piña Cooler** | Joseph Victori Wine<br>Brooklyn, NY | piña flavor added to Calvin Cooler line |
| **Wine Cooler Mixer** | Party Tyme<br>Overland Park, KS | two parts mixer is blended with one part wine |

technological developments and expertise are applied in the most effective way.

"Decisions on the launch of a new product are made through an ongoing evaluation process, as the product moves from a limited Home Use test, for example, into a specific test market and then into either regional or national distribution. Product management is constantly evaluating both the product and the marketing plan that supports it.

"The specific marketing plan employed is structured to meet the needs of the product in question. The plan will employ a mix of tactics, balancing advertising, consumer and trade promotions and—moreso in recent years—public relations activities."

Most marketing experts contacted by FE agree on how the new product should be promoted. "Support during the introduction can include a lot of different things—coupons, ROP (Run-of-Press) ads with coupons, television (and sometimes radio), magazines, sampling. It depends on the product and whether it's new or a line extension. There could be a big special event. You

*(Continued on page 66)*

| **Product** | **Manufacturer** | **Comments** |
|---|---|---|
| **May** | | |
| **Golden Wine Cooler** | Seagram's<br>New York, NY | "with premium wine taste" |
| **Sun Country Flavors** | Canandaigua Wine<br>Canandaigua, | two flavors added to line—cherry and peach |
| **Champale Coolers** | Iroquois Brands<br>Trenton, NJ | orange mimosa, strawberry daiquari, citrus sparkler, & pina colada flavors |
| **Georgia Peach Wine Cooler** | G. Heileman Brewing<br>La Crosse, WI<br>Country Cooler line | peach flavor added to |
| **Dewey Stevens Wine Cooler** | Anheuser-Busch<br>St. Louis, MO<br>(4% alcohol) | reduced calorie wine cooler |
| **June** | | |
| **Niagara Wine Cooler** | Widmer Wine Cellars<br>Naples, NY | wine, grape juice, & & club soda |
| **July** | | |
| **Tropic Sun Wine Cooler** | SVPW<br>Havre de Grace, MD | orange juice & NY state white wine |
| **Cream Coolers** | Old Dutch Imports<br>Orlando, FL | strawberry cream & banana cream<br>dairy-based, low alcohol |
| **T.J.Swann Chocolate Cooler** | Heublein<br>Farmington, CT | wine-based with natural artificial chocolate flavors |
| **Zinfandel Wine Cooler** | The Wine Group<br>Ripon, CA | made with varietal wine |
| **Squirt Wine Cooler** | Squirt<br>Holland, MI | combines MI and CA Wine with Squirt |

Source: New Product News, Dancer Fitzgerald Sample, Inc.

ones continue to be introduced.

One reason for this can partially be found by examining the phenomenal product category growth. When California Cooler created the product category in 1981, it shipped 700 cases of product. By 1984 the industry shipped 12.4 million cases. This has made wine coolers a $700 million product category.

Wine coolers are a combination of wine (usually white), fruit juice and/or flavors, citric acid, water, and carbon dioxide. They contain approximately six percent alcohol, about half that found in wine. This reduced amount of alcohol and the "healthy" image of fruit have contributed the wine coolers' success among a generation of health-conscious Americans.

Yet even with the shakeout among wine coolers, the $700 million market has created a lure that continues to attract new companies looking for a piece of the action. Many of the new products are aimed at finding a niche not yet filled. For example, the Franzia *White Zinfandel Wine Cooler* is trying to attract the more sophisticated table wine drinker by using a varietal wine. And, Anheuser-Busch is appealing to those who feel 6-percent-alcohol still adds too many calories by offering a 4-percent-alcohol wine cooler.

New flavors are also being used to attract people with peach, piña colada, and even chocolate (an exception from the fruit product) among the new varieties.

As new wine coolers continue to appear on the market, the shakeout will intensify but some of the new entries may end up as winners. And it is this possibility that continues to attract new wine coolers into an already crowded but lucrative field.

roast or a center loin can be prepared in a conventional or microwave oven. Initial distribution for this line is in Oklahoma City.

## Research

Many retailers are now trimming fat from meats to 1/4 inch rather than 1/2 inch. This will amount to 13 millions pounds of fat being trimmed a year by Kroger alone. But reducing the fat content doesn't stop here. Researchers at the Texas Agricultural Experiment Station have found that altering the diet of pigs can result in a lower saturated fat and total fat content.

In addition to studying diets, research into producing leaner meats has extended to extensive breeding programs. The results of one of these programs, begun about 10 years ago, is just reaching retail shelves. *UltraBeef* is the result of a research program involving Simmental cattle—originally imported from Switzerland.

The cattle used for UltraBeef weight an average of 60 to 90 pounds at birth in comparison to regular cattle which weigh 40 to 60 pounds at birth, explains Nathan Mash, president of MASH Meats which will be marketing UltraBeef. The higher initial weight in combination with a computer-controlled feeding program enables these cattle to be ready for slaughtering nine to twelve months earlier than traditional beef cattle. Since the cattle are younger at slaughtering time, the result is more tender beef, says Mash.

But the biggest advantage of UltraBeef is the reduced fat in the final product, resulting in more meat per pound of animal. Mash points out that this also translates into a beef with 38 percent fewer calories and 38 percent less cholesterol than traditional beef.

UltraBeef will be able to be labeled *Lite* under the USDA's new labeling policy regulating the use of *lite* and *lean* on foods containing meat and poultry. The new policy stipulates that:

- *Extra lean* will be reserved for products that contain no more than five percent of the fat found in the majority of similar products.
- *Lean* and *low fat* are for products containing no more than 10 percent of the fat of the majority of similar products.
- *Light, lite, leaner,* or *low fat* are for products containing at least 25 percent less fat than the majority of similar products.

In the area of pork, Swift Independent, Chicago, has introduced *Lite Pork* with 25% less fat. Currently, two of Swift plants have USDA approval to produce Lite Pork. Chemical analyses are run at the plants to test for total fat, calories, protein, and carbohydrates of the pork. The lite pork is produced by both trimming the cuts of meat to 1/8 inch fat and by paying premium prices for leaner hogs. Swift Lite Pork was available in 600 to 700 supermarkets nationwide last summer—a number expected to double by this month. Some supermarkets are absorbing the extra cost of Lite Pork, while other are passing it on to the consumers but report consumers are willing to pay extra for leaner meat.

## Advertising/promotion

Without advertising, many consumers will remain unaware of these new, leaner meat products. The Beef Industry Council, representing everyone from ranchers to retailers has undertaken a $10 million national advertising campaign. Its theme is "Beef is healthy and necessary for a balanced diet—it's the fat you must avoid."

By educating the public to identify fat—not red meat—as the culprit and then providing leaner cuts of meat, the meat industry has begun the uphill battle of winning back consumers. And while meat may not regain it former status, it is beginning to outgrow its bad-for-you image.

might promote the product by getting on radio talk shows, demonstrate it on television, and prepare special stories with recipes for the food section of newspapers."

## Where and how to market test

U.S. marketers currently spend at least $1 billion annually to test market new products. But, the experts agree, there are no firm rules on how to do it. Recently, William M. Shaffer, public relations manager at General Mills, was quoted as saying: "There's no formula to predict how a product will be greeted at first in the marketplace, or what will happen to it after it gets there. The only constant about the test-marketing process I can identify is that there are no constants."

One rule of thumb is to avoid areas where the product is either heavily accepted or almost totally unknown. And you should test in at least two widely spaced markets. Campbell Soup Co. introduced *Prego* spaghetti sauce in Youngstown, OH and Green Bay, WI, for example. And Pepsico tested its *Lemon-Lime Slice* in Phoenix, Milwaukee, Rochester and Tulsa. The second *Slice* flavor, *Mandarin Orange,* was tested in Phoenix and Hartford. Then, last spring, two more *Slice* flavors were rolled out nationally without any test marketing.

A relatively new and low-cost method of test marketing a product is to use electronic mini-markets, often a small town with only a few supermarkets. The test is likely to be performed by a firm such as A.C. Nielsen Co., which guarantees confidentiality. In effect, Nielsen signs up a large group of consumers and supplies them with "member" cards that are scanned at the market along with their regular purchases. That gives Nielsen electronic fodder for its data bank, and a daily log of product movement.

Electronic testing can give you a better handle on household demographics. By using direct mail, you can run 2-3 tests in the same city, comparing ad appeals. Electronic market testing is still new, though, and it's limited, so traditional methods of market testing will continue to be the standard.

## Case history of a new product

Nabisco Brands USA, now a part of R.J. Reynolds Industries, invests about $50 million annually in R&D. Last year, Nabisco's earnings from operations increased 19 percent on a sales gain of 3 percent. Several factors contributed to this increase, including the success of new product programs.

In 1985, Nabisco maintained a leadership

*(Continued on page 68)*

position in U.S. cookie and cracker markets due largely to the success of new products such as *Oreo Mint Cremes, Blueberry Newtons* and *Cherry Newtons*, and a 15-variety line of snack crackers—built on the *Wheat Thins, Better Cheddars* and *Great Crisps* brands—that increased snack cracker volume 21 percent. Nabisco also introduced three low-salt crackers.

The popularity of *Planters Honey Roasted* nuts helped generate increases in Planters volume and market share. And Nabisco hot cereals increased share in 1985 due partly to the successful relaunch of *Mix 'n Eat* hot

## New foods developed specifically for microwave ovens

As the number of U.S. households with microwave ovens continues to climb, more and more products are being developed specifically for preparation in a microwave oven. Microwave popcorn has been around for a while, but new brands continue to be introduced. And new products such as *Hot Scoop* (a microwaveable sundae—see *FE*, September, 1986, p. 53), *Microwave Peanut Brittle, MicroFresh Vegetables*, and *Microwave Tater Tots* are becoming more and more common.

Earlier this year, Paul Newman expanded his product line to include *Newman's Own Microwave Popcorn*. The product contains three pop-and-serve packages and carries a suggested retail price of $2.25 a box.

Curtice-Burns and Deli-Express have also introduced popcorn products this past year. Curtice Burns' National Oats, Cedar Rapids, IA, is offering a premium priced *Super Pop Microwave Pop Corn*. And Deli-Express, Eden Prairie, MN, is attempting to carve a specific niche in this category by offering microwave popcorn seasoned with Lite Salt. Both regular and butter flavors are available. Also new in this category is American Pop Corn Company's *Jolly Time Microwave Popcorn* with white kernels.

NEW! CRISPY!
Ore Ida
MICROWAVE
CRINKLE CUTS

Jolly Time
POP CORN
in 3 POP & SERVE BAGS
NEW!
MICROWAVE
POPCORN
with Natural Flavor

If your taste does not run toward popcorn, there's always microwaveable peanut brittle from Peerless Confection, Chicago. One cup each of *Peermelts Butter Buttons* and nuts are cooked in a microwave oven for five minutes. A homemade peanut brittle results when the mixture is cooled.

MicroFresh VEGETABLES
MICROWAVE COOK IN BOX
Winter Mix

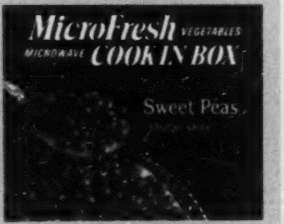
On the Italian front, Pillsbury has added a *French Bread Pizza* to its line of microwaveable pizza products. Packaging for these products includes a silver-colored tray designed to ensure that the pizza maintains its crisp-crust texture throughout the microwave process. Pillsbury Microwave French Bread Pizza comes in four varieties: cheese, pepperoni, sausage, and a combination of both pepperoni and sausage.

Ore-Ida's new line of microwaveable potato products also includes a specially designed package to help crisp the product during cooking. The boxes are constructed so the top flap can be folded around under the bottom of the package during microwaving. A *Qwik Crisp* board in the bottom of the package aids in providing a final crisp product.

MicroFresh VEGETABLES
MICROWAVE COOK IN BOX
Chinese Vegetables

In addition to a specially designed packaged, Qwik Crisp potato products are formulated specifically for microwave cooking. Tater Tots, Crinkle Cuts, and Hash Browns are offered in this line.

Maintaining a crisp microwaveable product is not the only challenge processors face. Packages with high water content products in them cannot allow that moisture to leak out. This was one of the considerations in designing the boxes for *Micro Fresh Vegetables*. A double poly-coated carton is used due to its low moisture vapor transmission rates. MicroFresh Vegetables are prepared by opening the package's lid, adding two tablespoons of water, closing the lid, and microwaving.



MicroFresh Vegetables are manufactured by Patterson Frozen Foods, Inc., Patterson, CA. The company mostly produces products for private label but is developing the MicroFresh line for companies interested in marketing the product under that label. About 20 items are offered in this line, including chopped broccoli, cauliflower in cheese sauce, cut leaf spinach, and Hawaiian style vegetables.

NEW! CRISPY!
Ore Ida
MICROWAVE
TATER TOTS

As the microwave oven becomes an even more common appliance in American kitchens, foods developed specifically for microwave preparation will become even more plentiful.

cereals. In ready-to-eat cereals, encouraged by consumer interest in nutritious foods, the company introduced *Nabisco Shredded Wheat 'n Bran* cereal in 1985.

Clearly, Nabisco is a highly successful company when it comes to developing and marketing new food products. But how do they do it? For an answer, let's look back a few years to 1983, when Nabisco introduced one of the most successful new products in its history – shredded wheat & raisins.

*Toasted Wheat & Raisins* is a 100%-natural, shredded whole wheat, bite-size biscuit. "Its basic strength," says a spokeswoman for the Grocery Products Division (GPD), "is that it's the only raisin cereal with no added sugar or salt." Nabisco's first ready-to-eat breakfast cereal in 15 years, it represented an incremental business worth many millions of dollars a year. To market it, the GPD invested $14 million – more than it had ever spent on any one product.

"Our first step was a Concept Screening Program," says the spokeswoman. "Basically, we presented consumers with more than 40 concepts of new ready-to-eat cereals based on shredded wheat technology. They singled out one as exceptional – a raisin cereal made from natural whole wheat with no added sugar and no added salt."

The new cereal combines two food textures and flavors that are highly desirable to consumers: crispy, toasted *Shredded Wheat* cereal and soft, sweet California raisins. So, in the early development stages, R&D experimented with several sizes and shapes of cereal biscuits for manufacturing feasibility, consumer acceptance and compatibility with raisins. "The size and shape of the biscuit were critical to achieve even raisin distribution from top to bottom in the cereal box. We wanted every bowl of cereal to contain the right amount of raisins."

Under a Brand Manager, the product development team conducted plant trials, and in-house and consumer taste panels before selecting a smaller, lighter-weight version of the *SPOON SIZE Shredded Wheat Biscuit*. California seedless raisins (from *Sun Maid Growers*) were selected from several possible types because of their lighter color, smaller size and sweeter flavor.

Next came a volumetric test – in which consumers are surveyed in a shopping mall environment and exposed to the product, package and key selling message. They're then given a sample box of product and, after a week or two, are contacted and asked questions about the product.

*(Continued on page 72)*

## New foreign foods with doubtful U.S. appeal

Foods popular in foreign countries have often served as the impetus for successful new products in this country. The croissant, yogurt, and surimi-based foods – to name a few – all had their beginnings in other countries. Successful launching of new products, though, does involve correctly identifying acceptance by the intended consumers.

Our sister magazine, *Food Engineering International*, recently conducted a survey of new products throughout the world. And while the world seems to be getting smaller in terms of varying tastes, there are still numerous products popular in foreign countries that the majority of Americans are not ready to accept and, perhaps, may never be willing to accept. One of these is a frozen dinner recently introduced in Singapore – *Curry Fish Head*. Part of a new line of frozen entrees, Curry Fish Head can be heated in a steamer or microwave oven. It is also offered in an institutional pack size.

**A new product in Singapore, this frozen Curry Fish Head frozen entree, will most likely not become a popular U.S. dish.**

Also from the Far East hails another new product that would probably meet with doubtful success in U.S. markets. A *chocolate covered pickled scallion confectionery* is among the new products in Japan. The product is made by placing pickled scallions in a sodium alginate solution and then a calcium chloride solution to prevent the scallions from drying out. They are then chocolate coated. But then there are those U.S. consumers who some claim would eat anything that is chocolate-coated.

From the other side of the world comes another new product *Heinz Spread* in Tomato and Onion; and Celery, Corn & Apple varieties. These recent additions to a line of spreads in England are part of an accepted concept in England which has not caught on in the U.S. These spreads are sometimes used on their own as a sandwich filling, or are sometimes used to "liven up" a sandwich. The original varieties are Cucumber and Sandwich Spread.

As global marketing becomes more widespread and ethnic or foreign foods become more and more common in this country, there will always remain those products which appeal to only a segment of the world's population.

The Brand Manager then took the consumer data, along with the proposed advertising spending plan, trade and consumer programs, and put them into a sophisticated computer model. With these elements of the marketing mix entered, the computer came up with the volume potential.

"The answer was loud and clear," says the spokeswoman. "*Toasted Wheat & Raisins* was right on target! The volume estimate met our objective and the project was given the green light." Thus, in the spring of 1983, the Niagara Falls, NY, bakery began shipping *Toasted Wheat & Raisins*—half a month ahead of schedule.

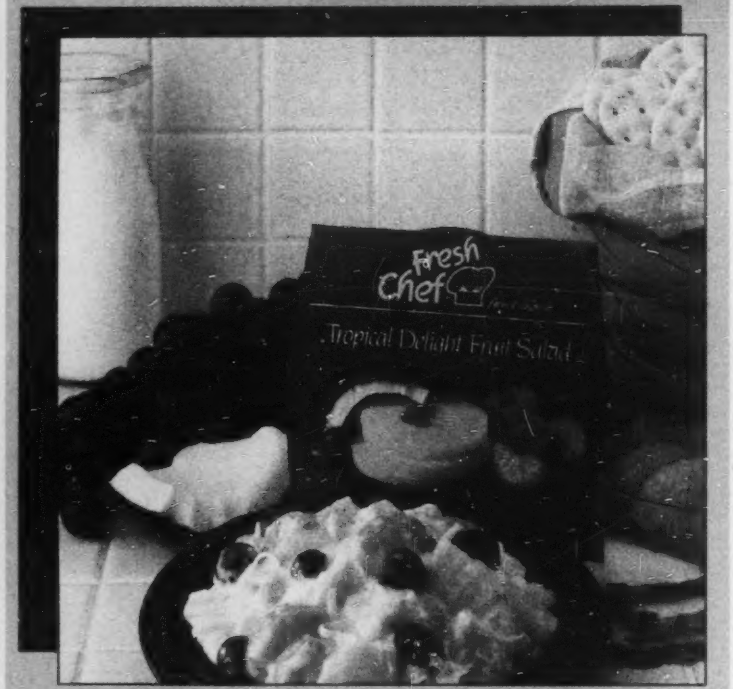
To launch a new ready-to-eat cereal requires a major investment. The *Toasted Wheat & Raisins* advertising program, for example, was designed to generate over two billion household impressions, and to deliver an average of over 25 commercial announcements to every television household in America. These messages were backed up with a major coupon drop—43 million, 25-cents-off, high-value coupons delivered by a 4-color, half-page Sunday newspaper insert plus a 35-cents-off coupon.

In September, 1983, Nabisco shipped three million trial-sized packages which included a coupon worth 15 cents against the purchase of the regular 14-ounce size. All in all, the advertising and promotion was expected to reach 83 million television households. And the total coupon campaign was worth more than $40 million to consumers.

Moreover, to create excitement about the new product, the GPD supported the rollout with a public relations program. Its aim was to generate consumer awareness, encourage trial, communicate the complete health and nutrition story, establish a unique position in the consumers' minds for the new brand, and build brand loyalty.

"The introduction of *Shredded Wheat & Raisins* is an excellent example of how dedicated teamwork can lead to a successful new product launch," reports William B. McKnight, GPD president. "All areas of the Division contributed to this success—Market Research, R&D in the original development, Manufacturing in providing a new form of cereal processing, and Marketing & Sales in preparing the introductory plan.

"This close teamwork allowed for the development and consumer testing of many alternative options in product formulation, packaging, names and in advertising approaches. Consumer testing has proved successful with other new products. We feel that, through this approach, the odds for success are dramatically improved."



## Growth seen in refrigerated foods

It comes as no surprise that refrigerated sections of supermarkets are expanding. Consumers—in their ongoing search for convenient, high quality foods—are turning to value-added, refrigerated foods to provide "home cooked" quality without a major time investment. Speaking about Campbell's *Fresh Chef* line, Martin Buchalski, general manager of the refrigerated-foods business unit said, "Growth in our new Fresh Chef refrigerated line is testament to the strong consumer demand for refrigerated foods that exists in the marketplace."

Test marketing of the Fresh Chef line began in October of 1984. Currently the line—which includes salads, sauces and soups—is in 85 percent of the country. Introduction of entrees and desserts to the line will follow. The salads have a shelf life of approximately two weeks, and the soups and sauces have a four to five week shelf life. And to ensure freshness, the salads are produced at six locations around the country and shipped directly to retail outlets.

The first full line of refrigerated, value-added products to be offered on a national level come from ConAgra Inc. An independent operating unit, ConAgra Deli Co., was formed to handle this line of 80 new products—which includes entrees, salads and pasta, breaded products, cheese, and processed meat items. Another major processor looking for a piece of the refrigerated, value-added market is General Foods. It is testing marketing a line of refrigerated dinners under the *Culinova* label in selected Northeastern supermarkets.

One reason making it easier for national processors to distribute fresh, refrigerated foods is improved distribution. Deregulation of the trucking industry brought increased competition, lower rates, and reduced the times of trips. This—coupled with innovations such as atmospheric-control systems that regulate the temperature, humidity, and other conditions in storage areas and truck trailers—allow fresh items to arrive at supermarkets in better condition. And desire for higher quality foods is a major reason consumers purchase refrigerated foods.

# IS IT TIME FOR THAILAND?

*Alluring incentives in hand, the Thais are hunting food companies.*

*JIM WAGNER*
*Editor-in-Chief*
*Food Engineering International*

Thailand, like a great many Southeast Asia nations, is looking to come increasingly into the twentieth century, and looking to do it through the twentieth century's most available means—capitalism. It is actively seeking investors, and the industry it is pursuing most fervently is not chemicals or electronics but food processing.

The Thai food industry has made great strides in the last five years. During the early '80s, annual growth averaged 23 percent. However, gross sales only averaged 20 billion baht, about US $769 million (one dollar = 26.1 baht). In comparison, General Foods's *net* sales in 1984 were $8.6 billion.

The Thai Board of Investment (BOI) would like to improve these numbers dramatically. To do so, it is searching for food companies with the money and desire to reach Asian markets.

## Another motive

The BOI has other reasons for seeking foreign capital. Thailand wants to kickstart its sluggish economy.

Over the last twenty years, Thailand became the most progressive nation in Southeast Asia. It had a model economy. Gross domestic product always grew by at least 7 percent annually. Buoyed by tin, rice and cassava, money was available for new

*(Continued on page 76)*

Here, on a fish cleaning line, we see one of Thailand's greatest resources – its people.

roads, power plants, a satellite communications system, a municipal water system, and the creation of large industrial estates around but not in congested Bangkok.

In the last two years, Thailand's financial growth slowed to a crawl. Prices for Thai rice and tapioca sagged. The bottom fell out of its ailing tin industry. Thailand still fared better than other Asian nations, but the gap began closing. GDP grew 6 percent in 1984, only 4.1 percent in 1985 and is expected to remain flat this year.

Realizing foreign investment was essential to stop the slide, the Board of Investment took the offensive last year. The BOI is empowered to deal using a lucrative incentive program. It doesn't hesitate. Already many "big name" food companies have begun operations with the BOI's assistance. Among those are Nestlè, General Foods, Foremost Dairies, Dole, Daily Foods Ltd., Roza Food Products, Brook Foods, and CPC International (making Best Food jams and jellies and Knorr dehydrated foods). More recent deals are in negotiation between Nabisco and Thai Dairy, and Oscar Mayer and the CP Group (CP is Thailand's largest food concern).

Ingredient suppliers also have come to tap the rich flow of commodities, especially cassava. National Starch, International Flavors and Fragrances, and Griffith Laboratories are just three examples.

With the right backing, Thailand's food industry could become a major player in the Far East. That's what the government is hoping for, and what the BOI is working toward. "We want and need to become the supermarket of Asia," said Staporn Kavitanon, deputy secretary-general of the Board of Investment. "We certainly have a base in our commodities. Thailand is the fastest growing exporter in the world. Once we imported sugar. Today we export 95 percent of what we grow. We were number one in pineapples last year -- 20 million cases in a 50 million case market. With rice, we are the number one exporter, even greater than the U.S. Our cassava crop dominates 95 percent of the world market. You can see our greatest potential is agribusiness."

## Only the beginning

If anything, the BOI is more active this year. Consider its latest effort. In June, a delegation lead by Staporn Kavitanon made a whirlwind tour of the U.S. In two hectic weeks, the delegates spoke with over 100 food companies, including Borden, Campbell Soup, Hormel, Ocean Spray, FMC Corporation, and International Multifoods. "We must knock on, if not *down*, the doors of companies who could be prospective investors," said Kavitanon.

Once through those doors, the Thais expect to snag investors with a two-pronged hook. First they present the inherent advantages of operating in Thailand: cheap labor ($3.00 per day or less per worker); a sound infrastructure (unlike China); a modern communications network; over 150,000 sq. kilometers of paved roads; electrical power supplied by a national grid; relatively inexpensive land ($50,000 per acre developed and $20-$30 per sq. ft. construction costs); and ready access to domestic as well as to Asian markets.

The other prong is a tailor-made financial package. The Thais know other Asian countries have similar advantages, so in 1977, the government gave the Board of Investment teeth by passing the Investment Promotion Act (B.E. 2520). The BOI can bargain with potential investors, and it will offer: exemption or 50 percent reduction in import duties and business taxes on imported machinery; up to 90 percent reduction on import duties and business taxes on imported raw materials and components; suspension of corporate income taxes for from three to eight years; the ability to carry forward losses and deduct them as expenses for up to five years; and much more.

Sometimes the deals are too "sweet." Dr. Nimit Nontapunthawat, vice president, chief economist and manager of research at Bangkok Bank Ltd., commented, "Incentive packages are always strong, perhaps too strong. I don't know how long the BOI will offer these packages." Smiling, he finished by saying, "Now is a very opportune time to invest here."

Mr. Wisanupong Parksook, assistant managing director for General Foods Poultry, said BOI is helpful, but tightening up. "When we started up, the BOI saved us about US $50 million. But I understand BOI is getting stricter because the industrial estates are crowded. I believe we made the right decision at the right time."

## The best opportunities

Thailand's emerging food industry has two dominant features. It is export oriented, and centered around canning.

Although more Thais are buying canned seafood these days, Thailand is still very much a fresh market. It is difficult to sell canned pineapple when fresh can be purchased for 10 baht. Therefore, investors can expect most if not all product to be exported,

*(Continued on page 78)*

### Seafood Exports

| | Volume Metric Tons | Value US$ Million | US$/ Ton |
|---|---|---|---|
| Canned tuna | 39,862.4 | 78.4 | 1,966 |
| Cuttlefish, fresh, chilled, frozen | 37,549.0 | 66.4 | 1,786 |
| Shrimp, prawns, lobsters fresh, chilled, frozen | 19,428.2 | 118.4 | 6,093 |
| Canned shrimp | 11,632.0 | 38.8 | 3,335 |
| Canned crabmeat | 6,985.0 | 33.9 | 4,853 |
| Canned baby clams | 6,709.9 | 12.8 | 1,907 |
| Shrimp, prawns, lobsters, boiled | 4,304.5 | 14.9 | 3,461 |
| Cuttlefish, salted, dried | 3,736.4 | 33.3 | 8,912 |
| Squid, fresh, chilled, frozen | 3,426.9 | 4.1 | 1,196 |
| Canned sardines | 2,412.1 | 2.5 | 1,036 |
| Shrimp, prawns, lobsters salted, dried | 1,930.4 | 8.4 | 4,351 |
| Canned cuttlefish | 1,804.6 | 2.8 | 1,551 |
| Squid, salted, dried | 104.5 | 0.7 | 66,698 |

which is why many companies come there in the first place. Thai companies easily reach all of Asia, including Japan and China. "Some people use Thailand as the gateway to China," said Kavitanon. "Sometimes we're the back door."

The Board of Investment would like to see companies augment the canning industry. "The canning industry already is huge. What we need is upstream processing to add value," said Kavitanon. "Other forms of packaging would be welcome. We are looking for projects that take advantage of our wealth of fresh commodities."

To pin down what it is looking for, the BOI completed a study in February outlining the best investment opportunities. Those initiatives most likely to succeed will need to meet five criteria:

1. Make products for established export markets.
2. Make high value-added products
3. Incorporate high technology.
4. Require considerable labor.
5. Require implementation within five years.

BOI feels aquaculture projects are extremely viable, especially brackish shrimp farming. Thailand has had phenomenal growth with shrimp. In 1977, there were 1,437 farms. Today there are over 4,300

## Seafood most established

Seafood canning is Thailand's most established segment. At last count there were 62 canneries. Of these, 19 received promotional privileges from the BOI. A government survey showed 65 percent of all production is fish, and the remaining 35 percent is crab, shrimp, and clams.

Thailand's 20,000 vessel fishing fleet ranks seventh in the world. Canned tuna makes up 55 percent of the 82,000 metric tons exported in 1984. About 23,250 metric tons were shipped to the U.S. West Germany was second with 5,326 tons.

Some opportunity remains. According to the BOI, any project would have to be large to survive the competitive marketplace. An alternative is canning other seafood such as cuttle fish, squid and mollusks.

Thailand also has a thriving frozen seafood industry. Over 80 percent is exported since the domestic market, as with other products, prefers fresh. In 1984, 19,500 metric tons of frozen shrimp, prawns, and lobsters were shipped. Over 7,000 tons went to Japan; the rest went to the U.S., Hong Kong, the U.K., Australia, and Singapore.

The next "growth" industry after seafood is canned fruit. Pineapple is the cornerstone, and it is rising every year. The first pineapple cannery was built only 16 years ago in Prachuap located in the middle of the long, narrow stretch of land that makes up central Thailand. In 1975, total pineapple capacity was 9 million cases. In 1985, over 200,000 metric tons were exported, mostly to the U.S., Germany, Canada, Japan, the Netherlands, and Saudi Arabia.

Exotic and tropical fruits are abundant. Papaya, mangoes, passion fruit, guava, tangarines and bananas grow all year. There is a market for canned or aseptically packaged juices and purees. Dole Pineapple is reported to have good success with a pineapple juice in a Tetra Pak carton.

Still, there are problems. Thai farmers lack high quality seeds. In addition, farms are not up to date. Corporations such as Dole or Cha-Um Pineapple must supervise their plantations carefully. Efforts are being made to educate farmers, but the task will take years. For example, some farmers will not monitor fruit size, or harvest when sugar content is right. On a more elementary level, some farmers resist the idea that they can do better financially when their entire harvest is taken by a big company rather than selling it off piecemeal themselves in the local market. The situation is definitely improving as the government works with farmers. However, the large corporations will still have to manage the crop for years to come.

One commodity starting on the ground floor is mushrooms. According to BOI, the

## Key Thai Economic Indicators 1982-1985

| | 1982 | 1983 | 1984 | 1985 |
|---|---|---|---|---|
| | | ($ Billions US$ and %) | | |
| GNP | 35,564 | 38,997 | 40,600 | 37,240 |
| Current prices | 733 | 788 | 806 | 725 |
| Per capita | 23.0 | 22.8 | 20.2 | 18.0 |
| At 1972 prices | 13,411 | 14,268 | 14,658 | 13,306 |
| Est. Growth rate | 3.6 | 6.4 | 5.4 | 4.1 |
| Debt. Service | 1,522.6 | 1,750.8 | 2,009.7 | NA |
| Ratio(%) | 16.6 | 19.5 | 19.6 | 21.4 |
| Imports | | | | |
| Total imports | 8,530 | 10,265 | 10,286 | 9,260 |
| Total agri. imports | 541 | 628 | 739 | 705 |
| % of total | 6.3 | 6.1 | 7.2 | 7.6 |
| Exports | | | | |
| Total exports | 6,770 | 6,295 | 7,274 | 7,125 |
| Total agri. exports | 4,429 | 3,917 | 4,443 | 3,965 |
| % of total | 65.4 | 62.2 | 61.1 | 55.6 |
| Balance of trade | -1,760 | -3,970 | -3,012 | -2,235 |
| Bal. of agri. trade | 3,888 | 3,288 | 3,704 | 3,260 |
| CPI | 181.1 | 187.9 | 189.5 | 194.1 |
| Food index | 176.6 | 185.5 | 183.4 | 178.9 |
| Terms of trade index | 79.02 | 89.91 | 83.41 | NA |
| Balance of payments | 144 | -786 | 448 | 456 |

Notes:
1985 data is preliminary. The Thai definition of debt service ratio excludes purchases of foregin currency (borrowings from IMF) and all debt with repayment periods of less than one year. If included, the 1985 foreign debt service ratio would be about 27.7%. Consumer price index (CPI) and food index are based on 1976 (1976 = 100). The terms of trade index is based on 1980.

potential is worth the risk. The world market in 1985 was one million tons per year. Thailand exported a mere 16 tons. Singapore alone imported 1,000 tons of canned mushrooms back in 1981.

The Thais are perfectly capable of adapting. Pineapples are one success story, grapes, strawberries, and palm oil are others in the making. With grapes, for instance, the Thais had no substantial production before 1984. That year, they exported nearly 1,000 metric tons.

Opportunities also exist in meat, poultry and dairy. Since 1980, chicken production has climbed from 560,000 head to 850,000. Frozen chicken exports reached 30,000 metric tons last year, 90 percent going to Japan.

The meat industry is also growing quickly on the strength of joint ventures. Two major projects are in negotiation. Oscar Mayer and the CP Group, Thailand's largest agribusiness concern, are discussing slaughterhouses and export products. So are the Mah Boonkrong Group, and RFM of the Phillippines (the Swift brand licensee).

The domestic dairy industry was set up in 1962 with the help of the Danish. Most milk is UHT treated and pasteurized for the domestic market. Some diversification is taken place. A milk powder plant reportedly will be on stream by 1989.

### Inside Thai food plants

BOI requires investors to work with Thai companies in joint ventures. Describing an "average" Thai food plant is difficult. Some are huge. Unicord Tuna employs over 4,000 people. Cha-Um Pineapple employs at least that many during the season, 2,500 per shift, and produces 20,000 tons of pineapple per day. Both have their own can making facilities and the equipment is new, fast and relatively sophisticated. On the other hand, one small export firm employs less than 100, and nearly all the work is done by hand.

Sanitation standards vary almost as much as size. General Foods Poultry near Bangkok could pass inspection by any agency in any country. Contact surfaces are all stainless steel, floors and walls are were built for washdown without crevices, workers wear gowns, hats, and gloves, etc. Moderately sized, GF employs 600 people and kills about 40,000 birds per day. But in another company we visited, workers carried product in plastic baskets, some broken and some unwashed.

### Should you invest in Thailand?

Experts say Thailand is a good investment. It has raw materials, a sound infrastructure, good location, and inexpensive labor. Its disadvantages are especially cumbersome regulations and the often slow movements of the government.

There is a Thai legend about a statue supposedly made of lead. For centuries it stood in an obscure place in a *wai*, or temple. One day its was being cleaned when some of the lead came off. The statue was solid gold, hidden under a coating of lead to protect it from raiders.

An investment in Thailand is much the same. On the surface, the going can be rough—dealing with the loose bureacracy can be trying. Underneath, the effort can be pure gold.

Acidulants, like the food products they have historically acidified, occupy a mature market characterized by slow growth.

But recent marketing, regulatory and technological developments are boosting volume and applications for acidulants in certain market segments. Examples:

- The soft-drink boom is expanding use of phosphoric and citric acids, and to some degree malic, fumaric and lactic acids as well.
- Wine coolers, which soared from ground zero in 1982 to 86.2 million gallons in 1985, opened up a new application for citric acid. New malt coolers unveiled last year by several brewers also contain citric acid.
- FDA's August, 1986 ban on sulfiting agents as preservatives on fruits and vegetables served or sold raw to consumers (as in salad bars and supermarkets) boosts applications for acidulants as sulfite replacers. "The existence of these alternatives shows that FDA's action will not have a negative impact on the food industry," said the agency in it's July 9th ruling. Acidulants further show promise for preserving potatoes and potato products, where sulfites are currently GRAS but may be banned in a forthcoming regulation.
- In an ongoing technology, acidulants are safely reducing time/temperature requirements to upgrade quality of canned foods. In what may be a breakthrough, American Can Company's *Salad Bar Fresh* process (*FE* Apr., '85) applies acidulants to dramatically reduce thermal processing of low-acid foods, allowing some foods currently sold only fresh or frozen to be canned or other-

*(Continued on page 84)*

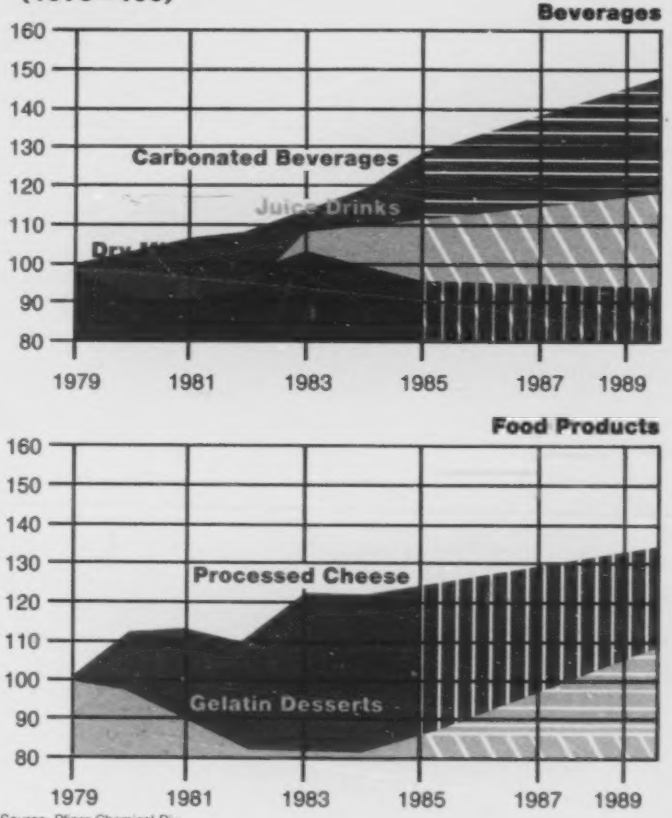
# ACIDULANTS FIND GROWTH NICHES IN MATURE MARKET

*New products, savvy marketing, regulatory trends and technical advances boost acidulant applications in some market segments.*

# ACIDULANTS

## MAJOR FOOD ACIDULANT APPLICATIONS

Product Volume Index
(1979=100)



Source: Pfizer Chemical Div.

wise packaged for extended shelf life. Although the acidulants are GRAS, American Can at this writing was awaiting FDA acceptance of the process and had already licensed 35 canners to use the system. Salad Bar Fresh products may yet appear on supermarket shelves before the end of the year.

Basic trend: While most acidulant applications are mature, "future growth occurs where these applications are stimulated through increased advertising, promotion and new products," said Thomas E. Ruth, marketing manager for the Chemical Division of Pfizer, Inc., who discussed acidulant trends and developments at the annual meeting of the American Chemical Society last April in New York City.

### Citric: Top gun

Acidulants perform a wide range of functions across a galaxy of food products. Major functions: To impart tart, tangy, sour tastes and modify other flavors; to lower pH, thus prevent growth of microbes which cause spoilage and food poisoning; to chelate trace metals in synergy with antioxidants, preventing discoloration and rancidity. Acidulants and their salts further control viscosity, serve as melt modifiers, gelling agents, buffering agents and emulsifiers.

Citric acid dominates the acidulant market. According to Pfizer, 1985 volume and market share of major food acidulants ranked as follows:

| Acid | Use (Mil. Lbs.) | %Share |
|---|---|---|
| Citric | 175 | 74 |
| Phosphoric | 35 | 15 |
| Malic | 10 | 4 |
| Fumaric | 6 | 2.5 |
| Lactic | 6 | 2.5 |
| Adipic | 5 | 2 |
| Tartaric | 1 | |
| Total: | 238 | 100 |

*(Note: Figures for phosphoric acid exclude its derivative phosphates, some of which are used as acidulants.)*

### Carbonated: "Most exciting"

Major food applications for acidulants, said Ruth: Carbonated beverages, dry beverage mixes, processed cheese, single-strength juice drinks and gelatin desserts.

Carbonated beverages are currently "the most exciting," he continued. As shown on the accompanying graph, acidulant applications in this category soared at an annual rate of 4 to 8 percent (1982-85), and are projected to grow at roughly the same pace at least through 1990. Reason, said Ruth: The proliferation and promotion of new products, especially in the diet aspartame-sweetened segment which has expanded soft-drink market growth beyond mere population growth. New products such as carbonated drinks containing fruit juices, *Cherry Coke* and other "niche-targeted offerings" will keep this market growing.

Acids compete in some beverages and have no competition in others, Ruth continued. Phosphoric acid, used mainly to modify flavors in colas and root beers, has no competitors in cola due mainly to its low cost. Citric acid is most widely used in other carbonated beverages, but malic and fumaric acids are used for the same functions. Lactic acid is used in some soft drinks, such as pepper types, where it imparts a uniquely mild tart flavor.

Juice drinks lurched up sharply in 1982 with the introduction of aseptic packaging and a retreating recession but have since leveled off to slower, steadier growth. De-

Salad Bar Fresh process uses acidulant formula to reduce heat treatment and upgrade quality of low-acid foods in cans, retort pouches and retortable plastic containers. (Source: American Can Co.)

mand will continue to grow slowly, Ruth predicted. Dry beverage mixes bounced up about 7 percent in 1982 with the introduction of aspartame-sweetened products but have slowly declined since, probably due to the introduction of aspartame-sweetened carbonated beverages following FDA clearance for that application in 1983. This trend is expected to continue for several years.

## Malic cuts aspartame costs

But cost savings might give acidulants another boost in the diet segment of the dry-beverage category. At IFT Food Expo '86 in Dallas, Denka Chemical Corp. cited a recent study showing that aspartame (which reportedly costs $90 per lb.) can be reduced 10 to 20 percent in sugar-free fruit-drink mixes by using malic acid or a blend of malic and fumaric acids as the acidulant.

Denka, which acquired the malic and fumaric acid lines of Alberta Gas Chemical last year, is the only U.S. manufacturer of malic acid and one of only two in North America, says Connie Dunn, assistant to the president at Denka. (The other: Bartek Chemical Co. in Ontario.)

Dunn expresses surprise at misconceptions about malic acid. "People identify it as 'the apple acid,' yet it's found in many fruits beyond apples," she points out. "The acid content of watermelon, for example, is 100 percent malic, yet at a trade show I was served a watermelon beverage containing citric acid. The food scientists serving it didn't know that watermelon is naturally high in malic and that they didn't need citric acid." Cherries are also very high in malic acid: One cherry-flavored wine cooler uses malic instead of citric acid as the acidulant.

**ASPARTAME-SWEETENED SUGAR-FREE FRUIT PUNCH DRINK MIX**

NOTES: Artificial Color is Red #40, 99.83%; Blue #1, 0.17%

| Ingredients | Per Cent | Grams per Pouch @ 2 Quarts/Pouch |
|---|---|---|
| Malic Acid | 49.7175 | 5.9661 |
| Maltrin 10 | 29.2817 | 3.5138 |
| Natural and Artificial Flavors | 8.5783 | 1.0294 |
| Aspartame | 7.8917 | 0.9470 |
| Cloud—Beatreme | 1.8591 | 0.2231 |
| Artificial Color* | 1.4567 | 0.1748 |
| Vitamin C | 1.2150 | 0.1458 |
| Total | 100.0000 | 12.0000 |

Source: Denka Chemical Corp.

Sales of dry beverage mixes, which incorporate citric acid or other acidulants for tart taste, grew sharply with the introduction of aspartame-sweetened varieties.

## Which way gelatin?

Among major food applications for acidulants, processed cheese grew at a rate of about 3 percent per year in 1980-84 and should continue growing at an annual rate of 2 percent through 1990 based on population growth and slightly increasing popularity, said Ruth.

Demand for gelatin desserts, after declining for four years, started growing in 1984 with the new aspartame-sweetened sugar-free products, but the future—as shown on the graph—is uncertain. "Will this category behave like carbonated beverages and maintain new growth, or will this be another situation like dry beverage mixes, where demand will flatten and drop off?" asked Ruth rhetorically. "Only time and the marketing staffs at General Foods and Nabisco Brands can tell."

*(Continued on page 86)*

# ACIDULANTS

UNTREATED
TREATED

**Blends of citric acid and erythorbic acid show promise of replacing sulfites as preservatives on potatoes and potato products. (Source: Pfizer Chemical Div.)**

## Sulfite replacers

Synergistic blends of citric acid and erythorbic acid or ascorbic acid (Vitamin C) can replace sulfites to prevent browning of fresh fruits and vegetables in the wake of FDA's sulfite ban.

According to Miles Laboratories, studies they have done comparing acidulant blends with sulfites demonstrated that sliced lettuce dipped in a citric/ascorbic bath for 30 seconds, then packaged in oxygen-permeable bags and refrigerated at 38°F resisted discoloration for five days compared to seven days for lettuce treated with sulfites. Further studies showed that shelf life can be extended by combining the acid treatment with vacuum packaging, so tests with Cryovac packaging are now underway, said Thomas R. Schmidt, manager of applications research at Miles.

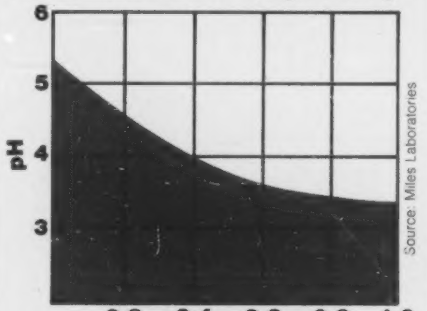
Applications of acidulants to replace sulfites actually surged in 1983-84 when major food-service operators voluntarily switched to citric acid and citric acid/phosphate blends in response to reports of allergic reactions to sulfites, said Schmidt. "That demand has leveled off," he added. "The next stage is applying acidulants to preserving potatoes and apples."

To prevent browning of vegetables for two to four hours at room temperature, Miles recommends immersion in a 1 to 2 percent citric acid bath for 30-35 seconds. For longer preservation, Miles recommends a solution of 0.3 to 1 percent citric and 0.05 to 0.5 percent ascorbic or erythorbic for 45 to 120 seconds, followed by vacuum-packaging and refrigeration.

Pfizer recommends a 5:1 citric/erythorbic blend to retard browning of fresh fruits and vegetables. In tests at Pfizer, lettuce dipped for 1 to 3 minutes, then packaged and refrigerated, resisted browning for six days. Sliced Red Delicious apples dipped in the same bath resisted browning in air at room temperature for more then four hours.

Citric/erythorbic and citric/ascorbic blends further show promise for preserving potatoes. In tests at Pfizer, raw potatoes dipped in a citric/erythorbic bath for 2 minutes, packaged and refrigerated resisted browning for more than 48 hours. Preliminary results of tests at Miles using a citric/ascorbic blend with Cryovac packaging on sliced potatoes indicate shelf life of 14 days at 4°C (39°F).

**EFFECT OF CITRIC ACID ON THE pH OF CANNED SLICED PEPPERS after 14 days storage**



**Heat-sensitive peppers can now be canned by lowering pH with citric acid to allow heat processing as "acidified foods" under FDA regulations. (Source: Miles Laboratories)**

## Crispier canned foods

Since the 1920s, canners have used acidulants where necessary to lower product pH to 4.6 and below to assure destruction of dangerous microorganisms while reducing time/temperature of heat processing to preserve product quality—taste, texture, color, nutritional values—to the highest possible degree. Citric acid is most commonly used. Reducing time and temperature further cuts energy costs and speeds up production.

This is an ongoing technology. Example: Fresh peppers are low-acid products with pH ranging from 4.9 to 5.8 depending on variables such as type, growing conditions and ripeness and are especially heat-sensitive. If processed under 21 CFR 113 specifications for low-acid foods "you'd end-up with mush," says Schmidt. Recent studies by Miles demonstrated that peppers can be acidified to allow canning as "acidified foods" under 21 CFR 114 and standards of identity for "certain other canned vegetables " under 21 CFR 115 and 155. Sliced green peppers with an initial pH of 5.5, for example, can be lowered to pH 4.2 by adding 0.3 percent citric acid. Sweeter, crispier peppers can now be preserved in No. 10 cans for the food-service and ingredient markets.

A new growth area for citric acid in acidifying foods: Pasta, said Schmidt. Until recently, pasta products such as spaghetti in

*(Continued on page 88)*

sauce were available only in cans and were somewhat "mushy." Citric acid reduces heat treatment so these products can now be packaged in jars; reduced heat treatment further firms texture and upgrades appearance. This will lead to further applications for pasta meals such as spaghetti with meatballs and lasagna, Schmidt believes.

American Can Company's Salad Bar Fresh process applies a proprietary acidulant formula called *PHM-1* to significantly reduce thermal processing for low-acid foods in cans, glass, retort pouches, retortable plastic cans and trays. According to Richard P. O'Neill, director of marketing for processed foods at American Can, 45 to 50 products have been successfully tested to date and 35 canners of national and regional brands are licensed to use the process.

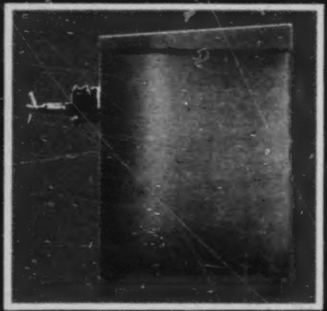
Pillsbury, for one, seems excited. "It has the potential to improve the consumer's perception of canned food quality while creating significant new-product opportunities for Green Giant," said Gary Klingl, group vice president at Pillsbury.

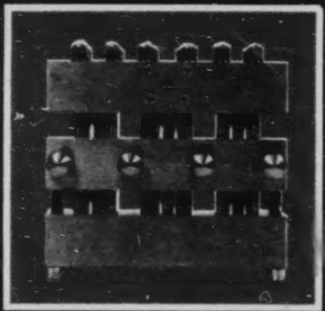
Salad Bar Fresh allows dramatic reductions in time and temperature while upgrading taste, texture and color. Example, said O'Neill: A typical process to achieve commercial sterility of diced carrots at their natural pH in a 303x406 can is about 30 minutes at 240°F. When the PHM acidulant is used, the process drops to 11 minutes at 220°F – down nearly two-thirds in time and 20 degrees in temperature. Carrots are crispier and brighter with less carmelization and cooked flavor.

Salad Bar Fresh allows canning of heat-sensitive foods – such as cauliflower and melon balls – never before successfully canned, says American Can, and upgrades quality of traditionally canned foods such as pasta, vegetables, rice and shrimp. With shrimp, the process reduces salt requirements while yielding firmer texture. Canners can reportedly use the process with little or no added equipment, no special can enamels or special containers. Further advantages: Increased retort throughput, lower energy and cooling-water costs.

Salad Bar Fresh should allow canning or barrier-plastic packaging of entrees currently sold only as frozen foods, says American Can. Tests with consumer focus groups in 1985 and 1986 evoked favorable comparisons with fresh foods.

So, regardless of the "maturity" of the market, there is, literally a world of applications still for acidulants. And the exploration will go on.





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